Five-Year Review Report

Fourth Five-Year Review Report for

Intel Magnetics/Micro Storage Corporation Superfund Site

Santa Clara, Santa Clara County, California

Approved by: Date: 9/26/12

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Executive Summary

This is the fourth Five-Year Review of the Intel Magnetics/Micro Storage Corporation (IM/MSC) Superfund Site (Site) located in Santa Clara, California. The purpose of this Five-Year Review is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this Five-Year Review (FYR) was the signing of the previous FYR on 28 September 2007.

The IM/MSC Site is approximately three acres in size and is located in Santa Clara, Santa Clara County, California. The Site is in an industrial park setting, formerly dominated by the electronics and semiconductor manufacturing industries. The IM/MSC Site is currently in use as general office space based on information obtained during the site inspection. The IM Site was placed on the National Priorities List (NPL) in May 1986 and the MSC Site was included with the IM Site in October 1988 as one combined Superfund site. Major contaminants initially detected at the Site included trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and Freon 113. The latest groundwater sampling event (conducted March 2012) detected TCE, 1,1-dichloroethene (1,1-DCE), and 1,1-dichloroethane (1,1-DCA) at levels above cleanup standards in Site groundwater. While not utilized as a drinking water source, shallow groundwater at the Site has been classified as a potential drinking water source.

In 1991, EPA selected pump and treat as the remedy to clean up shallow groundwater contamination at the IM/MSC Site in the Record of Decision (ROD). The remedy was selected to address potential risks to human health and the environment. In summary, the major components of the remedy included in the 1991 ROD were:

a) Perform continued groundwater extraction and treatment until drinking water standards are achieved in all combined IM/MSC site monitoring wells.

b) Achieve hydraulic containment of the entire groundwater plume containing contaminants at levels above cleanup standards.

c) Perform maintenance of hydraulic control to prohibit the further vertical and horizontal migration of the groundwater pollution. This requirement shall remain in effect until cleanup standards are achieved.

d) Perform continued quarterly groundwater monitoring at the combined IM/MSC Site during the cleanup period. The frequency of monitoring will be decreased upon approval.

e) Perform treatment of extracted groundwater with an existing carbon adsorption system. The treated groundwater will continue to be discharged to Calabazas Creek, pursuant to a NPDES permit.

f) File a deed restriction prohibiting use of on-site shallow groundwater for drinking water and controlling other subsurface activities until groundwater cleanup standards are achieved.

The selected remedy included a groundwater extraction and treatment system, which has not operated since 1996 as a result of a determination by the San Francisco Bay Regional Water Quality Control Board (RWQCB) that contaminant concentrations had reached asymptotic or near-asymptotic levels. Groundwater monitoring was conducted until 2006, at which time cleanup goals had not been met and there was a question as to whether an up-gradient source was impacting the Site. A single groundwater monitoring event conducted in support of this FYR suggests that contaminant concentrations are decreasing at the Site, yet levels are still above cleanup goals and no future monitoring is currently planned at the Site. The de facto remedy at the Site is monitored natural attenuation (MNA), but this change in the groundwater remedy has not been formally documented in an Explanation of Significant Differences (ESD) or ROD amendment. A deed restriction is associated with the MSC property, restricting shallow groundwater use, but EPA does not have evidence to suggest that a similar deed restriction is associated with the IM property.

Changes in the regulations identified as applicable or relevant and appropriate requirements (ARARs) in the ROD do not affect the protectiveness of the remedy. Exposure pathways identified in the ROD have not changed. Vapor intrusion was not identified as an exposure route in the ROD. Because TCE is sufficiently toxic and volatile, vapor intrusion may affect the protectiveness of the remedy.

A protectiveness determination of the remedy at the IM/MSC Site cannot be made at this time until a vapor intrusion assessment is complete. It is expected that this action will be completed by October 2013, at which time a protectiveness determination will be made via an addendum to the Fourth Five-Year Review. In addition, to be protective in the long term, the following actions need to be completed: a deed restriction (land use covenant) is needed on the IM property that prevents the use of Site shallow groundwater for drinking water; and a ROD Amendment or ESD is required to update the groundwater remedy.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Intel Magnetics/Micro Storage Corporation (IM/MSC)		
EPA ID: CAD092212497		
Region: 9	**State:** CA	**City/County:** Santa Clara/Santa Clara County

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:** Click here to enter text.
Author name (Federal or State Project Manager): Daewon Rojas-Mickelson (EPA Remedial Project Manager) Leanna Woods Pan and Jefferey Powers (USACE Technical Team)
Author affiliation: EPA and USACE Seattle District
Review period: November 2011 – August 2012
Date of site inspection: 17 January 2012
Type of review: Policy
Review number: 4
Triggering action date: 28 September 2007
Due date *(five years after triggering action date)*: 28 September 2012

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
N/A				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 1	**Issue Category: Remedy Performance**			
	Issue: No vapor intrusion investigation has been performed			
	Recommendation: Potential Vapor Intrusion (VI) impacts to office workers at the Site have not been evaluated. Offices are located above shallow VOC groundwater contamination.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	PRP	EPA	October 2013
OU(s): 1	**Issue Category: Institutional Controls**			
	Issue: Lack of evidence that a deed restriction has been recorded for the Intel Magnetics property			
	Recommendation: A deed restriction will be recorded for the Intel Magnetics property.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	September 2014
OU(s): 1	**Issue Category: Remedy Performance**			
	Issue: While MNA is currently the de facto remedy at the Site, no official documentation has been produced to reflect this remedy selection.			
	Recommendation: A feasibility study is needed to evaluate alternatives to groundwater extraction and treatment and provide the basis for amending the ROD to establish an updated Site remedy.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	June 2014

Sitewide Protectiveness Statement	
Protectiveness Determination: Protectiveness Deferred	*Addendum Due Date (if applicable):* December 2013
Protectiveness Statement: A protectiveness determination of the remedy at the IM/MSC Site cannot be made until a vapor intrusion assessment is conducted. It is expected that this action will be completed by October 2013, at which time a protectiveness determination will be made via an addendum to the Fourth Five-Year Review. In addition, to be protective in the long term, the following actions need to be completed: a deed restriction is placed on the IM property that prevents the use of Site shallow groundwater for drinking water; and a ROD Amendment or ESD is issued to update the groundwater remedy.	

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List of Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
BPHE	Baseline Public Health Evaluation
CDHS	California Department of Health Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Difference
FYR	Five-Year Review
IM/MSC	Intel Magnetics/Micro Storage Corporation
IRIS	Integrated Risk Information System
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
PHA	Public Health Assessment
RAOs	Remedial Action Objectives
RfC	Reference Concentration
RfD	Reference Dose
ROD	Record of Decision
RPM	Remedial Project Manager
RSLs	Regional Screening Levels
RWQCB	California Regional Water Quality Control Board (a.k.a. Water Board)
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
1,1,1-TCA	1,1,1-trichloroethane
TCE	Trichloroethene
USACE	U.S. Army Corps of Engineers

Fourth Five-Year Review Report

for

Intel Magnetics/Micro Storage Corporation Superfund Site

1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The FYR was conducted from January to June 2012 and prepared in accordance with the U.S. Environmental Protection Agency's (EPA) guidance document, Comprehensive Five-Year Review Guidance (USEPA, 2001). In addition, this report identifies any deficiencies found during the review and provides recommendations to address these deficiencies.

This Five-Year Review report is prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 121(c), and the National Contingency Plan (NCP) Section 300.400 (f)(4)(ii). CERCLA Section 121(c) states:

> "*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; Title 40 of the Code of Federal Regulations (CFR), Section 300.430(f)(4)(ii), which states:

> "*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action*."

EPA Region 9 and the U.S. Army Corps of Engineers (USACE) conducted the FYR and prepared this report regarding the remedy implemented at the Intel Magnetics/Micro Storage Corporation (IM/MSC) Site in Santa Clara, California. EPA is the lead agency for developing and implementing the remedy for the Site. The California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, as the support agency representing the State of California, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the fourth FYR for the IM/MSC Site. The triggering action for this policy review is the previous FYR, completed and approved September 2007. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure until cleanup levels have been achieved.

2. Site Chronology

Table 1 lists the dates of important events for the IM/MSC Superfund Site.

Table 1. Chronology of Site Events

Event	Date
IM/MSC Site developed from agricultural land to a business park.	1979
Groundwater contamination discovered at the IM Site.	1982
IM submits completed RWQCB facility questionnaire.	June 16, 1982
The MSC Site is identified as being a primary source of groundwater contamination.	June 10, 1985
IM removes an underground storage tank, which was a source of contamination on the IM Site, along with 35 cubic yards of soil.	July 1, 1985
RWQCB adopts NPDES Permit No. CA0028941 (Order No. 86-014) for the discharge of treated extracted groundwater at the IM Site. Groundwater extraction and treatment begins.	March 19, 1986
EPA adds IM Site to the National Priorities List.	May 1, 1986
Kim Camp III, owner of MSC, submits its tenants' Hazardous Chemical Use History Reports.	February 2, 1987
EPA changes the name of the Site from IM to the combined IM/MSC Site.	October 12, 1988
RWQCB adopts Order No. 89-017 issuing Site Cleanup Requirements to MSC and Kim Camp III.	February 15, 1989

Event	Date
RWQCB adopts Order No. 89-086 amending Site Cleanup Requirements to MSC, Kim Camp III, Intel, and Oakmead Village Drive Limited (approving the Remedial Investigation/Feasibility Study Work Plan and rescinding Order No. 89-017).	March 17, 1989
RWQCB adopts NPDES Permit No. CA0029670 (Order No. 90-040) for the discharge of treated extracted groundwater from the combined IM/MSC Site. Groundwater extraction and treatment from the expanded extraction system begins.	March 21, 1990
RWQCB adopts Order No. 91-119, the Final Site Cleanup Requirements for the combined IM/MSC Site.	July 17, 1991
Final Record of Decision is signed.	August 26, 1991
Preliminary Closeout Report signed.	August 18, 1992
RWQCB allows the groundwater extraction system to be shut down in response to a significant decline in contaminant removal rates and continuing equipment problems. RWQCB provides interim approval for a monitored natural attenuation trial to begin.	April 1, 1995
First Five-Year Review completed.	October 31, 1996
Second Five-Year Review completed.	September 29, 2002
Lead regulatory oversight agency transfer of responsibility from RWQCB to EPA. Site's federal Superfund status remains unchanged.	July 7, 2006
Last semi-annual groundwater sampling event conducted at the Site.	August 14, 2006
Third Five-Year Review completed (first FYR with EPA as lead agency).	September 28, 2007
IM/MSC Long-Term Monitoring Strategy Memorandum (Preliminary Draft).	November 14, 2011
Single groundwater sampling event to support Fourth Five-Year Review.	February-March 2012

3. Background

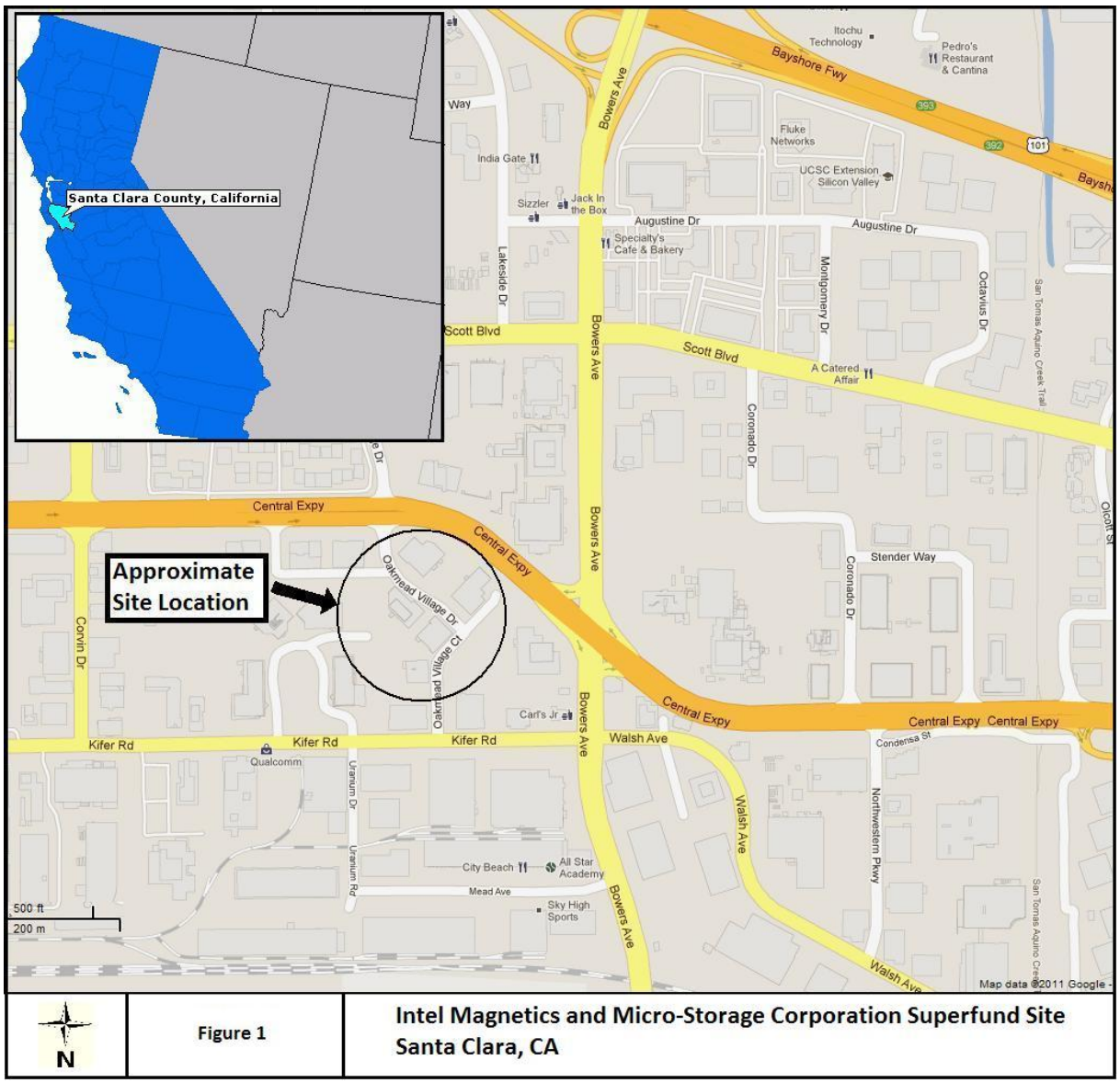
This section provides IM/MSC Site background including the IM/MSC Site description, the current land use, the physical setting, the history of contamination, the initial response, and the basis for taking action.

3.1. Physical Characteristics

The IM/MSC Site is approximately three acres in size and is located in Santa Clara, Santa Clara County, California. The Site's physical addresses is at 2986 and 3000 Oakmead Village Court. The IM/MSC Site is bounded to the north by the Central Expressway, to the east by Oakmead Village Court, to the south by Kifer Road and another property, and to the west by other properties including the Metropolitan Corporate Center, currently leased by QualComm. The former property owner and lead responsible party is Kimosabe, a successor entity to Kim Camp III. Figure 1 depicts the general location of the IM/MSC Site and Figure 2 presents a more detailed view of the Site.

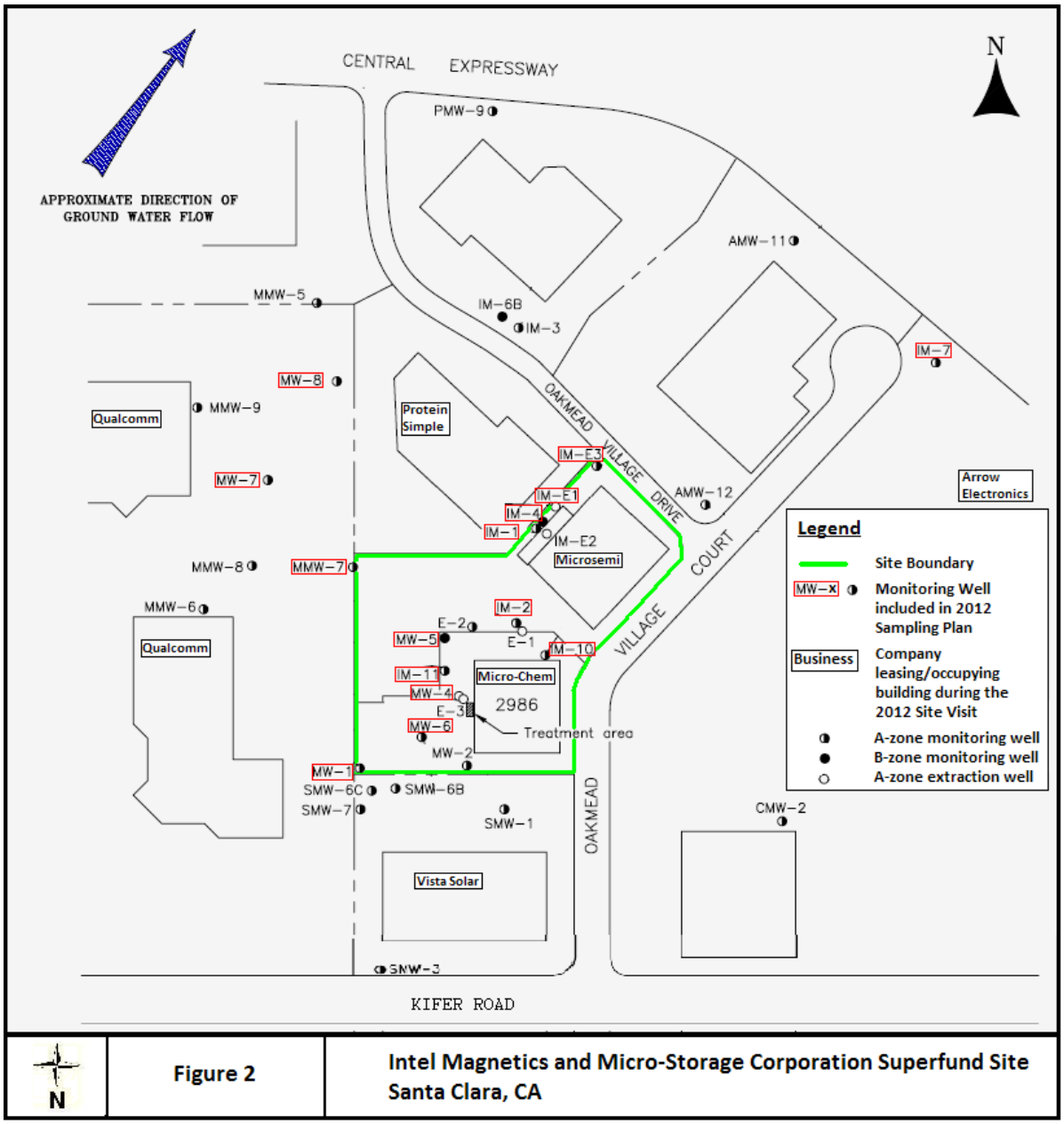
The Site is situated in a densely populated urban area within the South Bay area of San Francisco. The closest residential areas are approximately 0.3 miles to the south and 5.5 miles to the northwest. These residential areas are not within the area impacted by the past chemical releases from the IM/MSC Site (USEPA, 1991). The Site is in an industrial park setting, formerly dominated by the electronics and semiconductor manufacturing industries. Most buildings in the area are low-rise developments containing office space and research and development facilities. The majority of the area is developed, with large paved areas for streets and parking lots and limited landscaping around the borders of the Site. The IM/MSC Site is currently in use as general office space based on information obtained during the site inspection.

Site topography is flat, with a ground surface elevation of approximately 37 feet above mean sea level. The Santa Clara Valley is a large structural depression in the central coastal ranges of California. The valley is bounded by the Diablo Range to the northeast and the Santa Cruz and Gabilan Ranges to the southwest. The valley is filled with alluvial and fluvial deposits from the adjacent mountain ranges. These deposits are up to 1,500 feet thick. At the base of the adjacent mountain ranges, gently-sloping alluvial fans of the basin tributaries laterally merge to form an alluvial apron extending into the interior of the basin (USEPA, 1991). The IM/MSC Site overlies the Santa Clara Valley Groundwater Basin. Groundwater in the basin is an important natural resource, as it is the primary municipal drinking water source for the residents of the Santa Clara Valley. Approximately 70,000 people depend on groundwater as a source of drinking water within the city of Santa Clara (Santa Clara, 2011). Drinking water is also imported to supplement the groundwater supply, provided by San Francisco Public Utilities Commission (SFPUC) and the Santa Clara Valley Water District (SCVWD). Site surface water is controlled by the storm sewer system that directs runoff to nearby Calabazas Creek and ultimately to San Francisco Bay.



*Images obatined from http://www.epodunk.com, April 2012, and Google Maps 2011

Figure 1. Location Map for the Intel Magnetics/Micro Storage Corporation (IM/MSC) Superfund Site



*Original Figure was obtained from Second Semi-Annual 2006 Ground Water Monitoring Report, TRC Lowney.

Figure 2. Detailed Map of the IM/MSC Superfund Site

3.2. Hydrology

The IM/MSC site is located in an area known as South San Francisco Bay (South Bay) in the Santa Clara Valley Groundwater Basin. The basin occupies the southern end of the structural trough filled by San Francisco Bay (RWQCB 2003). The Santa Clara Valley Groundwater Basin is divided into two broad areas: 1) the Forebay, and 2) the Confined Area. The IM/MSC Site is located within the Confined Area of the basin. The Forebay occurs along the elevated edges of the basin where the basin receives its principal recharge. The Confined Area is located in the flatter interior portion of the basin

and is stratified or divided into individual beds separated by significant aquitards. The stratigraphy is characterized by alternating coarse and fine deposits reflecting alluvial depositions from the mountains alternating with fine-grained marine deposits, developed as the level of the Bay fluctuated. The Confined Area is divided into the upper and lower aquifer zones. The division is formed by an extensive regional aquitard that occurs at depths ranging from about 100 feet near the Confined Area's southern boundary to about 150 to 250 feet in the center of the Confined Area and beneath San Francisco Bay. The thickness of this regional aquitard varies from about 20 feet to over 100 feet. Many Santa Clara Basin municipal water supply wells tap the regional aquifer of the lower aquifer zone, beneath the aforementioned regional aquitard, at depths in excess of 250 feet.

Several aquifer systems occur in the upper aquifer zone separated by aquitards of varying vertical transmissivities, ranging from leaky to very tight depending on location. The portion of the upper aquifer zone below the IM/MSC Site is divided into two shallow aquifer zones referred to as the A-zone and B-zone. Groundwater pollution at the combined IM/MSC Site is confined to the shallow-most zone within the upper aquifer zone. The A-zone aquifer is the shallowest, with its upper boundary at about 10 feet below ground surface (bgs) and its lower boundary about 20 feet bgs, while the deeper B-zone aquifer has its upper and lower boundaries at approximately 30 and 40 feet bgs, respectively. The A-zone consists of a mixture of low and higher permeability clays, silts, and sands. The two zones are separated by a 2- to 10-foot-thick aquitard composed of clay to silty sand. It is suspected that hydraulic separation between the two zones is imperfect owing to the discontinuous nature of sediment types. The lower aquifer zone used for regional water supply is separated from the A- and B-zones of the upper aquifer by a practically impermeable regional aquitard. Numerous individual aquifers occur within this predominantly aquitard zone and all groundwater in this lower aquifer zone occurs confined.

Groundwater flow in the A-zone beneath the site is generally to the northeast, which is consistent with the northerly regional flow towards the San Francisco Bay (TRC Lowney 2006) as demonstrated by previous investigations in the vicinity. Historically, groundwater flow direction in the shallow zone may have changed several times in response to groundwater extraction and treatment systems. Groundwater flow in the B-zone at the Site could not be calculated as only two B-zone wells exist (MW-5 and IM-4). Historically, ground water flow is generally towards the west-northwest in the B-zone (TRC Lowney 2006).

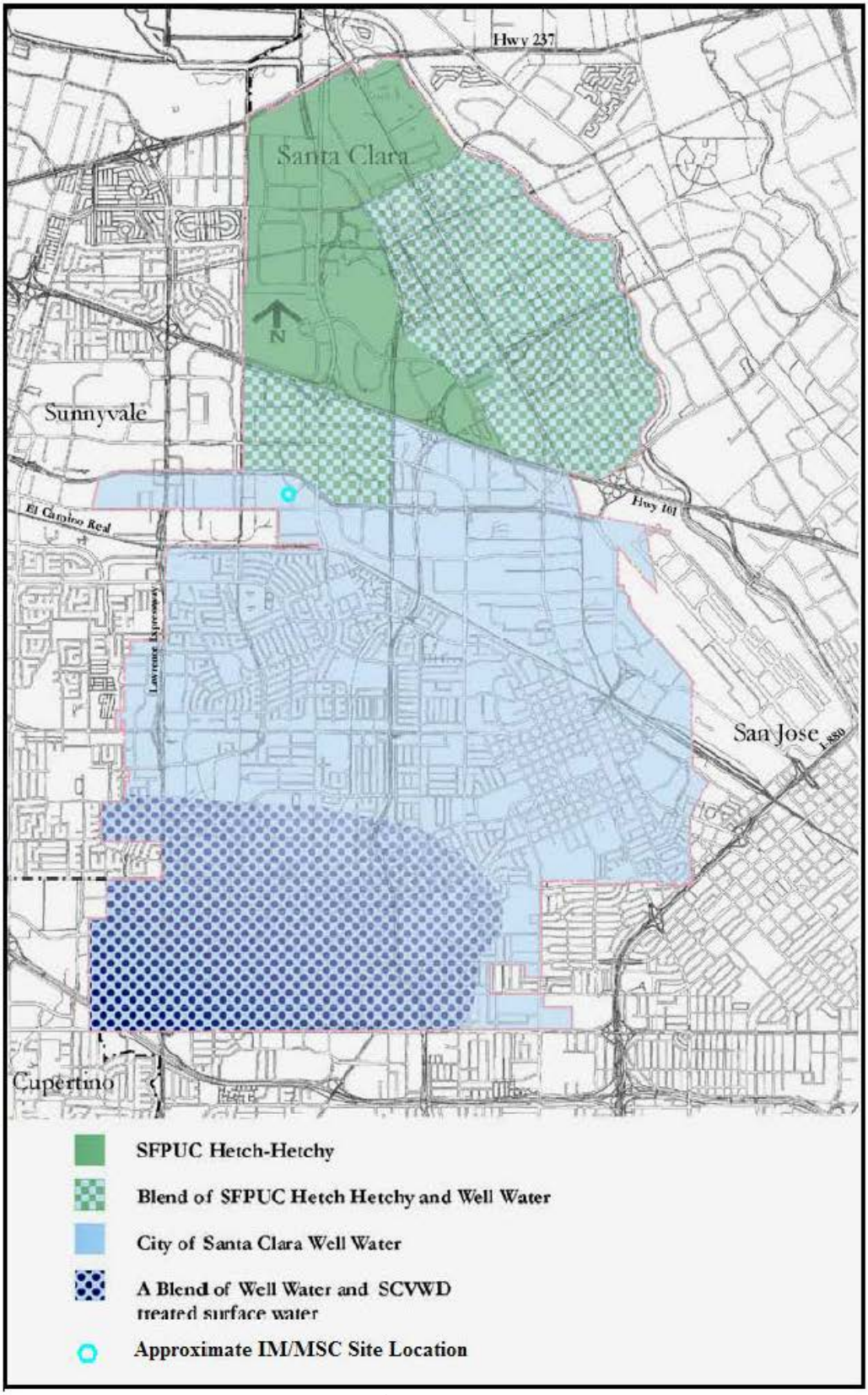
Shallow groundwater at IM/MSC within the B-zone (30 to 40 ft bgs) is classified as a potential drinking water source. However, municipal water supply wells generally obtain their water from the lower aquifer zone, which is separated from the upper aquifer by a regional aquitard (USEPA 2007). Screened intervals in the City of Santa Clara water supply wells located within 2 miles of the Site begin from 250 to 320 feet bgs, although sanitary seals are only installed down to 100 feet below ground surface. At the time of the ROD, the nearest municipal drinking water supply well down-gradient of the combined IM/MSC Site was the City of Santa Clara's Well No. 33, located 1.8 miles north of the Site. No contaminants had been found in this well at the time of the 1991 ROD. Since the A and B-zones are classified as a potential drinking water supply, cleanup standards are the drinking water maximum contaminant levels (MCLs).

Surface water is controlled by the storm sewer system which directs runoff to Calabazas Creek. The City of Santa Clara Water Management District operates and maintains 18 major recharge systems, which consist of both in-stream and off-stream facilities. Most of the local stormwater is recharged into the groundwater basin, either through natural stream channels, through canals, or through in-stream and off-stream ponds (Santa Clara, 2011).

3.3. Land and Resource Use

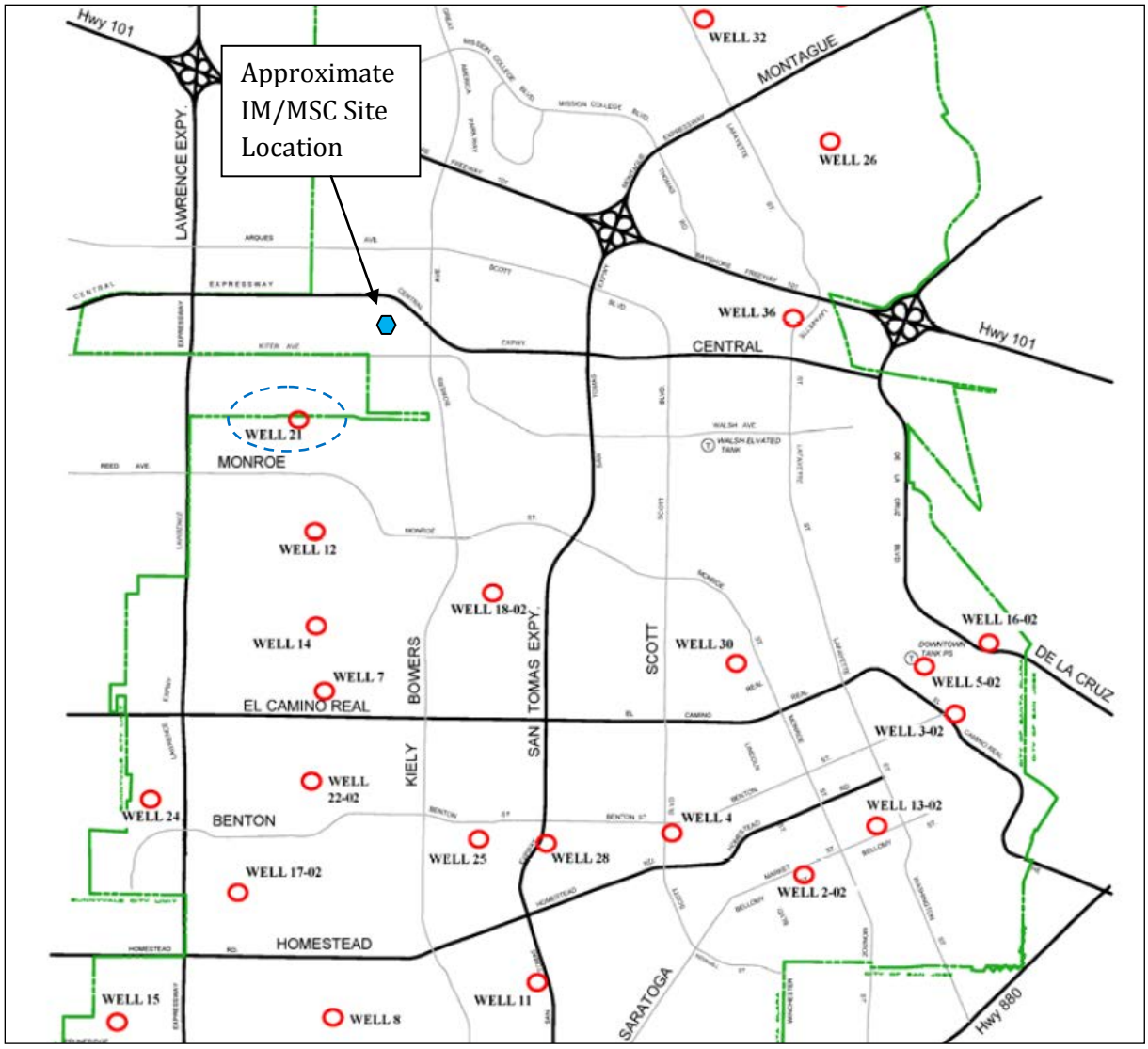
The site is located in an industrial park setting, formerly dominated by the electronics and semiconductor manufacturing industries. Former, current, and projected land use for the Site includes light-industrial use, such as office space, and commercial use. The IM/MSC Site is currently in use as general office space, leased by Microsemi Power Products and Micro-Chem Inc., respectively. There are no known plans for residential land use at or within 0.3 miles of the Site. The closest residential area is located approximately 1800 ft south of the Site, containing predominately single family residences as well as several schools in the neighborhood. Additional residences are located approximately 5.5 miles northwest of the Site and the campus of Mission College is located approximately 5 miles north of the Site.

City of Santa Clara well water is the primary source of drinking water for residents and businesses at the Site and immediately south (Figure 3). The local groundwater basin currently provides about two thirds of the City's potable water supply through 28 wells (Santa Clara 2011). North of the Site, drinking water is obtained both from the City of Santa Clara Well Water and imported from SFPUC. The closest groundwater well to the Site, supplying water to the City of Santa Clara, is approximately 0.5 miles SW of the Site and is identified as Well 21 (Figure 4). There are no known restrictions imposed by the City of Santa Clara on groundwater use in the vicinity of the Site. However, as required by the 1991 ROD, a deed restriction prohibits the use of on-site shallow groundwater for drinking water and controls other subsurface activities on the MSC property. EPA does not have evidence that a similar deed restriction has been recorded for the IM property.



Source: 2010 Urban Water Management Plan, City of Santa Clara Water Utility

Figure 3. City of Santa Clara Water Source by Area



Source: 2010 Urban Water Management Plan, City of Santa Clara Water Utility

Figure 4. City of Santa Clara Water Supply Wells

3.4. History of Contamination

Combined historic site activities at IM/MSC have resulted in shallow groundwater contamination with constituents of concern (COCs) Freon 113 and chlorinated solvents. Two primary and distinct sources of contamination have been identified for the IM/MSC site: the IM facility underground waste-solvent storage tank and the chemical storage area at MSC. Due to the density of electronics testing and manufacturing in the area and relatively poor records of chemical disposal, inputs from other source areas may have occurred and may continue to impact the site. Contaminants are present in the A-zone, and the B-zone appears unaffected.

Intel Magnetics (IM) occupied its property from 1978 to 1987 and was in operation, producing and testing computer memory products known as magnetic bubbles, from 1978 to 1985. The chemicals used for these activities included isopropanol, Freon, chlorinated hydrocarbons (unspecified, but reportedly did not include tetrachloroethene [PCE] or l,l,l-trichloroethane [TCA]), n-butyl acetate, Hunt Developer (isodecane C11 and C12), acetone, xylene, dilute acids, and the metals arsenic, chromium, lead, and tin. The IM facility had a 500-gallon single-wall steel underground storage tank (UST) and a 1000-gallon in-ground cement-lined acid neutralization system. The UST was installed at the IM site in 1978 and was used to store waste solvents. The RWQCB initiated widespread UST leak detection in 1982 and groundwater contamination was discovered in the vicinity of the IM UST. Groundwater testing in 1982 revealed 1,1,1-TCA, Freon 113 and trichloroethene (TCE) in shallow, A-zone groundwater near the IM UST. Wells screened in the B-zone were largely free of contaminants and have remained so across the site. The IM Site was added to the NPL in May 1986.

At the time of discovery of contamination at the IM site, the adjacent property to the south (up-gradient) was occupied by International Diagnostic Technology (IDT) (1979-1984). IDT reported using small quantities of hazardous materials as part of testing and development of medical devices. The Micro-Storage Corporation (MSC) leased the adjacent property after IDT, conducting research on disk drives at the site from January 1985 to December 1986. MSC used Freon 113 and other chlorinated solvents to clean electronic components, storing chemicals and chemical waste in an outdoor enclosure. The chemicals were stored in an external shaded storage area, located on the west side of the building on a concrete platform, typically in 5-gallon and 55-gallon drums on wooden pallets (USEPA 1991). Chemicals used in the MSC degreaser were transported in 55-gallon drums into the building, with waste chemicals returned to drums and stored in the exterior enclosure (CDHS 1992). No discrete source of contamination was found at MSC, and extensive soil gas samples yielded ambiguous results (USEPA 1991). However, Freon 113 and chlorinated solvents have been detected in shallow groundwater at the Site. Elevated concentrations of Freon 113 were found in wells up-gradient of IM in 1986, indicating the presence of a plume emanating from the direction of the MSC chemical storage shed. Based largely on groundwater sampling results, the MSC Site was included with the IM Site as one combined Superfund site on the NPL on October 12, 1988.

3.5. Initial Response

In 1985, as a result of ongoing soil and groundwater contamination studies, the 500-gallon IM UST was removed and 35 cubic yards of soil were excavated. In a new excavation, a 1,000-gallon, double-walled, stainless-steel tank was installed. Soil testing beneath the former 500-gallon UST area indicated tetrachloroethene (PCE) and 1,1,1-TCA contamination; however, no leaks were detected in the tank and chemical records do not indicate the storage of large quantities chlorinated solvents at this facility. The source of contamination at IM was determined to be overflow of the UST into the unlined gravel bed underlying the tank (USEPA 1991). A groundwater extraction and treatment system was installed in the area, which began treating groundwater upon adoption of a National Pollutant Discharge Elimination System (NPDES) permit by the RWQCB for the discharge of treated

extracted groundwater at the IM Site in March 1986. An additional NPDES permit was issued in March 1990 for the discharge of treated groundwater at the combined IM/MSC Site.

3.6. Basis for Taking Action

As mentioned in previous sections, the IM Site was placed on the NPL in May 1986 and the MSC Site was included with the IM Site in October 1988 as one combined Superfund site. In early 1982, as part of a wider RWQCB-initiated investigation into the extent of leakage from USTs and pipes in the South Bay area, TCE, TCA, and Freon 113 were detected in the A-zone aquifer below the IM Site. In the 1991 ROD, EPA noted a Jacobs Engineering report from 1988 that concluded that the MSC Site was likely the primary source of VOCs, while the IM Site represented a secondary source (USEPA, 1991). While not currently used for drinking water, shallow groundwater at the Site has been classified as a potential drinking water source. This presence of contaminants at levels above MCLs was the reason for selecting a groundwater restoration remedy for the IM/MSC Site.

4. Remedial Actions

4.1. Remedy Selection

This section summarizes remedial actions selected at the IM/MSC Site. The EPA issued the ROD for the Site in August 1991. Remedial Action Objectives (RAOs) were not included in the ROD. The major components of the remedy included in the 1991 ROD were:

a) Perform continued groundwater extraction until drinking water standards for TCE (5 µg/L); 1,1-dichloroethane (DCA) (5 µg/L); 1,1-DCE (4 µg/L); cis-1,2-DCE (6 µg/L); trans l,2-DCE (10 µg/L); Freon 113 (1,200 µg/L); dichloromethane or methylene chloride (40 µg/L); PCE (5 µg/L); toluene (100 µg/L); 1,1,1-TCA (200 µg/L); 1,1,2 TCA (32 µg/L; updated Sept 1994 to be 5 µg/L); and chloroform (100 µg/L; updated June 2006 to be 80 µg/L) are achieved in all combined IM/MSC site monitoring wells.

b) Achieve hydraulic containment of the entire groundwater plume above cleanup standards and continued groundwater extraction at the four existing wells. Modifications to the system are required in the event that the interim hydraulic control system is no longer effective in containing and removing the groundwater pollutants.

c) Perform maintenance of hydraulic control to prohibit the further vertical and horizontal migration of the groundwater pollution. This requirement shall remain in effect until cleanup standards are achieved.

d) Perform continued quarterly groundwater monitoring at the combined IM/MSC Site during the cleanup period. Continue to collect water samples to verify that cleanup is proceeding and that VOCs do not migrate above cleanup standard levels beyond current boundaries or into the deeper B-zone. The frequency of monitoring will be decreased from quarterly to triannually 2 years after approval of a report submitted in compliance with Provision C.4.a (hydraulic control) of the RWQCB Order. The frequency of monitoring will further be decreased to biannually once cleanup standards have been achieved and stabilized for 1 year. Detailed sampling and reporting requirements for the combined IM/MSC Site are contained in the RWQCB's Self-Monitoring Plan.

e) Perform treatment of extracted groundwater with an existing carbon adsorption system. The treated groundwater will continue to be discharged to Calabazas Creek, pursuant to a NPDES permit.

f) File a deed restriction prohibiting use of on-site shallow groundwater for drinking water and for controlling other subsurface activities. The deed restriction shall remain in place until groundwater cleanup standards are achieved.

In 1991, following issuance of the ROD, groundwater extraction was expanded to include the MSC Site. At this time, there were five extraction wells on the combined IM/MSC Site: four on the MSC Site and one on the IM Site.

4.2. Remedy Implementation and Operation & Maintenance (O&M)

Between 1991 and 1995, the expanded groundwater extraction system pumped approximately 15.6 million gallons of groundwater and removed approximately 12.5 pounds of TCE before discharging to the Calabazas Creek. At that time, TCE concentrations had been reduced from a high of up to 1,400 µg/L to approximately 100 µg/L; 1,1-DCE and cis-1,2-DCE had been reduced from highs of 28 µg/L and 65 µg/L, to about 5 µg/L and 8 µg/L, respectively. Other COCs were detected at levels below cleanup standards. While the amount of VOCs removed per volume of groundwater extracted steadily declined during this time period, mass removal rates of TCE remained constant by increasing the amount of water being extracted (RWQCB 1996).

In November 1993, Kim Camp III, owner of the MSC Site, recorded a covenant for the MSC property at 2986 Oakmead Village Court, Santa Clara, as required by the ROD. EPA has no evidence that a similar covenant was ever recorded for the IM Site.

In 1995, KCIII requested that it be allowed to shut down the extraction system. Frequent equipment failures were resulting in significant downtime of the extraction system. KCIII claimed that concentrations of VOCs in groundwater had reached asymptotic levels and that further groundwater extraction would not result in any significant further reductions in VOC concentrations, particularly when considering costs associated with continuing to run the system. Additionally, information from this site and other sites in the South San Francisco Bay area indicated that, while groundwater extraction is effective in removing contaminant mass, reducing VOC concentrations, and containing plumes, it may not be able to restore VOC-contaminated aquifers to background or drinking-water quality standards (RWQCB, 1996). In April 1995, the RWQCB approved this request, and the system has since remained shut down. Groundwater monitoring occurred at least biannually from 1995 to 2004. Groundwater was sampled once in 2005 and twice in 2006.

Following sampling reported in the Third Five-Year Review (USEPA 2007), no groundwater monitoring was conducted at the Site until the most recent single sampling event completed in March 2012, in support of this Fourth Five-Year Review. Operations and maintenance (O&M) costs have not been estimated for the Site since the Third Five-Year Review.

5. Progress Since the Last Five-Year Review

5.1. Previous Five-Year Review Protectiveness Statement and Issues

EPA issued the third (most recent) FYR report for IM/MSC Site in September 2007. The protectiveness statement from the third FYR for the IM/MSC Site was as follows:

> "The remedy at the IM/MSC Site is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long term, institutional controls need to be placed on the Intel Magnetics property."

The third FYR included four issues and recommendations. Table 2 lists each recommendation and its current status, and they are discussed below.

Table 2. Status of Recommendations from the 2007 FYR

Issues from previous FYR	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Although the plume appears to be stable or decreasing, many areas of the site continue to show contaminant levels above cleanup standards, particularly for trichloroethene and total 1,2-dichloroethene.	Continue biannual groundwater sampling, at a minimum, to monitor the plume stability and attenuation, and maintain institutional controls to prevent direct exposures.	potentially responsible party (PRP)	Ongoing	Groundwater sampling did not occur between 2006 and 2012. EPA sampled groundwater in 2012 for purposes of the FYR.	March 2012
Because asymptotic levels had been reached at the site, active groundwater extraction ceased and the groundwater extraction and treatment remedy was ultimately changed to monitored natural attenuation.	A ROD amendment will be necessary to document this modification and any other changes that affect the selected remedy.	EPA	Ongoing	A ROD amendment has not been completed. However, 2012 groundwater sampling continues to show decreasing concentrations.	N/A

Issues from previous FYR	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
A covenant for the MSC property has been recorded. However, EPA has no evidence that a covenant was ever recorded for the IM Site. The existing covenant was recorded prior to passage of California Civil Code section 1471, which establishes the framework for environmental covenants in California.	New restrictive covenants must be recorded for both properties that are consistent with current California law.	PRP, EPA, and the RWQCB	Ongoing	EPA is working with the RWQCB to record new institutional controls (ICs).	N/A
Groundwater contamination may be migrating onto the IM/MSC Site from an up-gradient, off-site source.	Investigate the potential off-site, up-gradient source. Additional remediation measures, including hydraulic controls, may be necessary to prevent further contaminant migration.	PRP	Ongoing	Potential contaminant migration onto the IM/MSC Site has not been investigated. However, trend analysis of data from previous sampling events combined with results from the 2012 groundwater sampling event suggests that the off-site plume may be attenuating and the potential source may not be continuous.	N/A

5.2. Work Completed at the Site During the Review Period

A single groundwater monitoring event was conducted by the USACE Seattle District for EPA Region 9 as part of the fourth FYR in order to evaluate current remedy progress and protectiveness. This was necessary due to the cessation of semi-annual groundwater monitoring at IM/MSC by the potentially responsible party's (PRP's) remedial contractor in August 2006. Data gained during this single groundwater monitoring event have been compared to previous data collected at the Site and are discussed in further detail in Section 6.4 and Appendix A.

6. Five-Year Review Process

6.1. Administrative Components

EPA Region 9 initiated the FYR in October 2011 and scheduled its completion for September, 2012. The EPA review team consisting of personnel from USACE, Seattle District including Leanna Woods Pan, environmental engineer, Jeff Powers, geologist, and Deborah Johnston, biologist, was led by Daewon Rojas-Mickelson of EPA, Remedial Project Manager (RPM) for the Intel Magnetics and Micro-Storage Corporation Superfund Site, and also included the EPA site attorney. In November 2011, EPA held a scoping call with the review team to discuss the Site and items of interest as they related to the protectiveness of the remedy currently in place. A review schedule was established that consisted of the following:

- Community notification;
- Document review;
- Data collection and review;
- Site inspection;
- Local interviews;
- Additional groundwater sampling; and
- Five-year review report development and review.

6.2. Community Involvement

On 18 January 2012, a public notice was published in the *Santa Clara Weekly* announcing the commencement of the Five-Year Review process for the IM/MSC Site, providing contact information for the Community Involvement Coordinator (Vicki Rosen), and inviting community participation. The public notice is available in Appendix B. EPA has not been contacted as a result of this advertisement.

The FYR report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repositories: 1) Santa Clara City Library at 2635 Homestead Road, Santa Clara, California and 2) EPA's Superfund Records Center at 95 Hawthorne Street, San Francisco, California. Upon completion of the FYR, a public notice will be placed in the Santa Clara Weekly to announce the availability of the final FYR report in the Site document repositories.

6.3. Document Review

This FYR included a review of relevant, site-related documents including the ROD, remedial action reports, and recent monitoring data. A complete list of the documents reviewed can be found in Appendix C.

ARARs Review

Section 121(d)(2)(A) of CERCLA specifies that Superfund remedial actions (RAs) must meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site.

The majority of regulations selected as chemical-specific ARARs have remained unchanged from the date of the original ROD (August 1991). The groundwater cleanup levels developed for the ROD were established by the California Regional Water Quality Control Board Site Cleanup Requirements Order No. 91-119. For specific chemicals (1,1- dichloroethane, Freon 113, dichloromethane, and 1,1,2-trichloroethane), only proposed maximum contaminant levels (MCLs) or maximum contaminant level goals (MCLGs) were available at the time the ROD was signed. Some of these levels have since been promulgated. Based on the evaluation of changes in the regulations identified in the ROD for the IM/MSC Superfund Site as ARARs, the changes in the regulations do not affect protectiveness of the remedy.

All cleanup goals listed in the ROD remained unchanged since the time of the third FYR. However, the third FYR report did not evaluate all of the cleanup goals against current regulations. An effort was made in this FYR to evaluate if ARARs matched current regulations and were consistent with CERCLA guidance [40 CFR 300.400(g)(2)]. Current chemical-specific ARARs are listed in Table 3. California primary drinking water standards are the same as federal primary drinking standards except for the California standards for benzene, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, Freon 113, and toluene, which are more stringent than federal standards. An evaluation of ARARs is provided in Table 4.

Table 3. Summary of Ground Water Chemical-Specific ARAR Changes

Contaminants of Concern	Ground water ARAR selected	Federal (mg/L)	State (mg/L)	Federal (mg/L)	State (mg/L)	Standard Changed Since ROD?
	1991 ROD ARAR	MCL at time of ROD		Current Regulations		
Benzene[1]	State MCL	0.005	0.001	0.005	0.001	No
1,1 Dichloroethane (1,1-DCA)	State MCL	NA[2]	0.005	NA	0.005	No
1,1 Dichloroethene (1,1-DCE)	NA	0.007	0.006	0.007	0.006	No

Contaminants of Concern	Ground water ARAR selected	Federal (mg/L)	State (mg/L)	Federal (mg/L)	State (mg/L)	Standard Changed Since ROD?
Cis 1,2 Dichloroethene (cis-1,2-DCE)	State MCL	0.070	0.006	0.070	0.006	No
Trans 1,2 Dichloroethene (trans-1,2-DCE)	State MCL	0.100	0.010	0.100	0.010	No
Freon 113 (1,1,2-Trichloro-1,2,2-Trifluoroethane)	State MCL	NA	1.2	NA	1.2	No
Dichloromethane (Methylene Chloride)	NA	NA	NA	0.005	0.005	Yes (No MCL at time of ROD)
Tetrachloroethene (PCE)	Federal MCL	0.005	0.005	0.005	0.005	No
1,1,1 Trichloroethane (1,1,1-TCA)	Federal MCL	0.200	0.200	0.200	0.200	No
1,1,2 Trichloroethane (1,1,2-TCA)	State MCL	NA	0.032	0.005	0.005	Yes
Trichloroethene (TCE)	Federal MCL	0.005	0.005	0.005	0.005	No
Toluene	NA	1.0	NA	1.0	0.15	Yes (State MCL adopted)

1. Chemical listed in ROD but not discussed in previous FYRs
2. NA – no level promulgated

Table 4. Applicable or Relevant and Appropriate Requirements Evaluation

Medium/Authority	ARAR	Requirement	Effect on Protectiveness
Contaminant-Specific ARAR	Citation		
Groundwater - Federal Drinking Water Standards	Federal SDWA[1] Section 1412, 42 USC §300f-1 and 40 CFR Part 141.11-141.6 National Primary Drinking Water Regulations	Standards have been adopted as enforceable standards for public drinking water systems.	There have been no changes to the federal MCLs since the last FYR. Protectiveness is not affected.
Groundwater - State Drinking Water Standards	CA SDWA Health and Safety Code, Div 5, Part 1, Chapter 7, 4020 et seq., California Domestic Water Quality Monitoring Regulations, CAC Title 22, Division 4, Chapter 15,§ 64401 et seq.	Establishes state MCL used to establish groundwater cleanup levels if more stringent than the federal MCL.	There have been changes to the state MCLs since the last FYR. Protectiveness is not affected
Action Specific ARAR	Citation		
Groundwater – Porter - Cologne Water Quality Control Act	California Water Code Division 7, Chapter 4, Article 4 §13263	Establishes authority for State and Regional Water Boards to determine site-specific discharge requirements.	Discharges into Calabazas Creek were regulated under NPDES Permit CA 0029670; however, operation of the pump and treat system ended in 1995.

Medium/Authority	ARAR	Requirement	Effect on Protectiveness
Groundwater discharge - Federal Clean Water Act (CWA)	33 USC 1251 et seq. Section 402 NPDES and California Water Code Division 7, Chapter 3 Article 4, §13160	Establishes authority for State to be the water pollution control agency for all purposes stated in the CWA NPDES requirements (Section 402 of CWA).	Discharge regulated under NPDES Permit CA0029670; however, operation of the pump and treat system ended in 1995.
Treatment by carbon adsorption system	Solid Waste Hazardous Waste Control as amended by Resource Conservation and Recovery Act 42 USC §6901 and California Hazardous Waste Control Health and Safety Code Division 20, Chapter 6.5, Articles 2, 4, 4.5, 5, 6, 6.5, and 7.7	Remedial activities involving on-site management of hazardous wastes from spent carbon disposal, storage, and handling.	The groundwater extraction and treatment system was shut off and has not been in operation since April 1995.

Risk Assessment Review

A Baseline Public Health Evaluation (BPHE) was prepared by Clement Associates Inc. for the RWQCB on May 1, 1990 to evaluate current and potential future health risks posed by the Site, as well as to evaluate the ramifications of the no-action remedial alternative and provide a basis for a feasibility study to set cleanup goals. The BPHE evaluated future exposure to chemicals of potential concern in groundwater and soil vapor via ingestion, inhalation, and dermal exposure. It was determined that there was no current risk at the Site, since the shallow zone groundwater was not utilized. The BPHE incorporated health conservative approaches and toxicological uncertainty factors into its evaluation. Therefore it was determined in this report that actual risk from the evaluated chemicals was unlikely to be higher, but may be lower, than those estimated in the BPHE (RWQCB 1990).

The 1991 ROD identified groundwater cleanup standards. The carcinogenic risk based on cleanup standards was calculated in the ROD to be 1×10^{-4}. Risks were calculated using a potential future use scenario with a 30-year exposure duration. The hazard index for non-carcinogens was identified as 0.38. The ROD states, "The final cleanup standards for the suite of chemicals detected in the shallow zone equate to a future use scenario and carcinogenic risk level for groundwater ingestion and inhalation of 1×10^{-4}." Determination of excess lifetime carcinogens risk based on the cleanup standard was calculated for select chemicals of concern.

A Public Health Assessment (PHA) was prepared in October 1992 by the California Department of Health Services (CDHS) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) in order to provide the community with information on the public health implications of specific hazardous waste at the Site. ATSDR and CDHS concluded in the PHA that the IM/MSC Site "represents no apparent health hazard," citing that significant future exposure to contaminants is unlikely if: 1) the groundwater extraction and treatment system reduces concentrations of site-related contaminants to below levels of health concern; 2) no future drinking water wells are placed in areas of known contamination; 3) future excavation or construction takes necessary precautions to ensure no worker exposure above levels of health concern; and 4) the site is not redeveloped for residential use unless subsurface soil contamination is remediated (CDHS 1992).

Risk analysis preformed as part of the ROD was reviewed to identify any changes in exposure or toxicity that would impact protectiveness. Risk assessment factors which can potentially have significant impacts on protectiveness include:

(1) Vapor intrusion was not evaluated as part of the original risk assessment and

(2) Toxicity values of contaminants of concern (COCs) from EPA's Integrated Risk Information System (IRIS) toxicity assessments have changed since the last FYR.

Vapor Intrusion. EPA's understanding of contaminant migration from soil gas and/or groundwater into buildings has evolved over the past few years leading to the conclusion that vapor intrusion may have a greater potential for posing risk to human health than assumed when the 1991 ROD was prepared. In September 2002, EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (USEPA 2002a).

Furthermore, the California EPA released guidance on vapor intrusion in October 2011 titled "Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air-Vapor Intrusion Guidance" (USEPA 2011).

Vapor intrusion was not evaluated during the 1991 ROD. At the time of the ROD, the highest concentrations of contaminants in the A-zone groundwater were: TCE (770 μg/L), TCA (570 μg/L), and Freon 113 (3,400 μg/L). Current groundwater data (as of March 2012) show detections of TCE, TCA, and Freon 113 in on-site wells at concentrations significantly less than those at the time of the ROD. The current maximum TCE, TCA, and Freon 113 concentrations are 84 μg/L, 1.1 μg/L, and 13 μg/L, respectively (Appendix A, Table A-1). The current screening level concentration for assessing the potential of TCE vapor intrusion is 20 μg/L for groundwater beneath industrial buildings. At the current concentration, TCE is considered sufficiently toxic and volatile, as defined in the vapor intrusion guidance cited above.

Currently much of the site is covered by asphalt parking lots, which presumably would act as a cap preventing exposure to potential soil vapors. Significant TCE concentrations have been detected in groundwater near the building currently leased by Micro-Chem Inc. (on the MSC property) and to a lesser degree near the building currently leased by Microsemi Power Products (on the IM property) and an off-site building currently leased by Protein Simple (Figure 2). The on-property buildings are currently occupied as split office/manufacturing space. In a telephone conversation with a Microsemi Power Products representative, it was discovered that MicroSemi Power Products uses solvents in its current operations and has an air scrubber as part of its heating, ventilating and air conditioning (HVAC) system. The operations at Micro-Chem also use solvents and store solvents on the property. The Micro-Chem building has no HVAC system, but relies on natural venting in the manufacturing section of the property to circulate air from inside the building to the outside.

Toxicity values. EPA's Integrated Risk Information System (IRIS) has a program to update toxicity values used by the Agency in risk assessments when newer scientific information becomes available. In the past five years, there have been a number of changes to the toxicity values for certain contaminants of concern at the Site. Revisions to the toxicity values for PCE, TCE, and cis-1,2-DCE indicate a higher risk from exposure to these chemicals than was previously considered. Revisions to the toxicity values for 1,1,1-TCA indicate a lower risk from exposure to this chemical than was previously considered. Table 5 lists the new toxicity values. Note that the old and new units of measure are not always the same.

Table 5. Toxicity Value Updates

Contaminant of Concern	New Toxicity Values[1]			
	Inhalation RfC[2] (non cancer)	Inhalation unit risk (cancer)	Oral RfD[3] (non cancer)	Oral slope factor (cancer)
Trichloroethene (TCE)	NEW: 0.002 mg/m^3	OLD: 7.3E-3 mg/kg-day NEW: 4E-6 µg/m^3	NEW: 0.0005 mg/kg-day	OLD: 0.013 mg/kg-day NEW: 0.046 mg/kg-day
Tetra-chloroethene (PCE)	NEW: 0.04 mg/m^3	OLD: 5.9E-6 µg/m^3 NEW: 2.6E-7 µg/m^3	OLD: 0.01mg/kg-day NEW: 0.006 mg/kg-day	OLD: 0.54 mg/kg-day NEW: 0.0021 mg/kg-day
cis-1,2-Dichloroethene (cis-1,2-DCE)	-	-	OLD: 0.01 mg/kg-day NEW: 0.002 mg/kg-day	-
1,1,1-Trichloroethane (1,1,1-TCA)	OLD: 0.63 mg/kg-day NEW: 5mg/m^3	-	OLD: 0.28 mg/kg-day NEW: 2 mg/kg-day	-

1. Toxicity values were not provided in the risk assessment discussion in the ROD. Old toxicity values presented here are from 2004 EPA Region 9 preliminary remedial goals except for PCE. New PCE toxicity values presented here are from 2011 EPA regional screening levels table, which match RSLs tables that were updated in May 2012.
2. RfC = reference concentration
3. RfD = reference dose

Groundwater data are compared to U.S. EPA Regional Screening Levels (RSLs) as a first step in determining whether response actions may be needed to address potential human health exposures. The RSLs are chemical-specific concentrations that correspond to an excess cancer risk level of $1x10^{-6}$ (or a Hazard Quotient (HQ) of 1 for noncarcinogens) developed for standard exposure scenarios (e.g., residential and commercial/industrial). RSLs are not de facto cleanup standards for a Superfund site, but they do provide a good indication of whether actions may be needed.

In September 2011, EPA completed a review of the TCE toxicity literature and posted on IRIS both cancer and non-cancer toxicity values which resulted in lower RSLs for TCE. The screening level for chronic exposure to TCE in drinking water for cancer excess risk level of $1x10^{-6}$ is 0.44 µg/L. EPA uses an excess cancer risk range between 10^{-4} and 10^{-6} for assessing potential exposures, which means a TCE concentration between 0.44 and 44 µg/L. The current MCL for TCE of 5 µg/L is within the revised protective carcinogenic risk range. EPA's 2011 Toxicological Review for TCE also developed safe levels that include at least a 10 fold margin of safety for health effects other than cancer. Any concentration below the non-cancer RSL indicates that no adverse non-cancer health effect from exposure is expected. Concentrations significantly above the RSL may indicate an increased potential of non-cancer effects. The non-cancer screening level for TCE is 2.6 µg/L. EPA considers the TCE MCL of 5 µg/L protective for both cancer and non-cancer effects.

EPA also released a reassessment of PCE toxicity values in February 2012. While the cancer risk decreased, the non-cancer risks are greater than previously assumed. The new multipathway screening

level associated with an excess cancer risk of $1x10^{-6}$ is 9.7 µg/L; the new non-cancer RSL 35 µg/L. The MCL of 5 µg/L continues to be protective.

Non-cancer toxicity values for cis-1,2-DCE decreased, indicating that this compound is more toxic than previously considered. The current RSL for cis-1,2-DCE is 28 µg/L. The clean up goal selected in the Record of Decision (based on the State MCL) is 6 µg/L and remains protective. Non-cancer toxicity values for 1,1,1-TCA increased, indicating that this compound is less toxic than previously considered. These changes do not impact the protectiveness of the remedy.

6.4. Data Review

Groundwater is the primary remaining media of concern for the site, and contaminants in soil gas/indoor air are expected to be proportionally related to contaminants of concern in Site groundwater. Soil, sediment, and surface water have either been previously addressed, resulting in contaminants at an acceptable level (e.g., soil), or were not media of concern for the Site (e.g., sediment, surface water).

Groundwater data from March 2012 were the primary data reviewed since this was the only data collected within the period of the current FYR, although groundwater data from the previous sampling event in 2006 were also reviewed, as were previous data within the context of a preliminary statistical evaluation performed by GSI Environmental (GSI 2011) using AFCEE's MAROS software (AFCEE 2004). The statistical evaluation was not updated to incorporate March 2012 results for purposes of data evaluation for the FYR, although qualitatively, the moderately reduced concentrations of COCs in 2012 compared to 2006 generally agree with the conclusions in the trend evaluation study (GSI 2011).

Based on groundwater analytical results up to and including 2006 and the trend evaluation study, concentration trends were variable across the site. Most of the wells in the vicinity of the Micro Storage Building (IM-10, IM-11, MW-1, MW-4, and MW-6) demonstrated decreasing or probably decreasing concentration trends for TCE. As a whole, this group of wells showed the highest concentrations of TCE across the Site, with concentrations above cleanup goals at these locations in 2006 (GSI 2011). The GSI data evaluation also noted that the decreasing TCE concentrations for wells MW-1 and MW-6, both considered hydraulically up-gradient from the former IM and MSC source areas, may indicate that the off-site plume was attenuating and less total mass was entering the IM/MSC Site from the up-gradient, off-site source.

The March 2012 groundwater sampling event conducted to support the FYR found the 14 wells monitored both during 2006 and 2012 to be in good communication with the native formation, thereby providing representative sample results of native groundwater. Furthermore, use of passive diffusion bag samplers was determined to be a simple but appropriate sampling methodology for the Site. Passive diffusion bags were utilized during the March 2012 sampling event and could be utilized for future monitoring. Since the sampling method differed between 2012 (passive diffusion bags) and 2006 and before (bailers and submersible pumps), some uncertainty concerning data comparability as a result of these differing sampling methods is acknowledged.

Based on March 2012 results, VOC contaminant concentrations have decreased modestly at most wells since 2006. The following three contaminants continue to be present in Site groundwater at levels above clean-up criteria: TCE, 1,1-DCE and 1,1-DCA. TCE in excess of 5 µg/L was observed at up-gradient wells MW-1, MW-4 and MW-6, and former source area wells IM-1, IM-2, IM-10, IM-11, and IM-E1. The highest TCE concentration in 2012 was 84 µg/L at IM-10. TCE increased modestly at IM-1, IM-11 and IM-E1. Groundwater sampled in up-gradient well MW-6 was found to contain TCE, 1,1-DCA and 1,1-DCE at levels in excess of the cleanup standards at 37.7 µg/L, 16.3 µg/L, and 7.7 µg/L, respectively (Table 6). There is some evidence of TCE reductive dechlorination with the presence of breakdown products 1,1-DCE and cis-1,2-DCE present in wells which also have TCE.

The relatively high, up-gradient TCE concentration that was observed in up-gradient wells, particularly at MW-1 during 2006, has likely been degraded as well as transported and dispersed to farther down-gradient locations as evidenced by lower TCE concentrations at nearly all locations. The marked decrease in TCE at MW-1 from 224 to 8.6 ug/L between 2006 and 2012 likely indicates that potential up-gradient contamination is not a continuous, long-term source. This interpretation also agrees with the 2011 trend evaluation conclusion that suggested the off-site plume was attenuating and less total contaminant mass was entering the IM/MSC Site from the up-gradient source.

There continues to be no indication that B-zone groundwater has been adversely affected since all contaminants of concern were non-detect in both B-zone wells (MW-5 and IM-4).

Table 6 summarizes recent (March 2012) concentrations of Site contaminants of concern and compares recent concentrations to those observed in 2006.

Table 6. Project Analytes Exceeding Cleanup Criteria in either 2006 or 2012, Results Compared

Well ID	TCE (ug/L)		cis-1,2-DCE (ug/L)		1,1-DCE (ug/L)		1,1-DCA (ug/L)	
	2006	2012	2006	2012	2006	2012	2006	2012
MW-1	**224**	**8.6**	**34.9**	1.0	<1	<0.5	<0.5	<0.5
MW-4	**10.9**	**8.9**	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MW-5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MW-6	**56.8**	**37.7**	5.48	3.6	**15.4**	**7.7**	**38.7**	**16.3**
MW-7	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MW-8	2.95	0.8	3.34	<0.5	<1	<0.5	<0.5	<0.5
IM-1	**5.2**	**7.9**	<0.5	0.2 C1,J	<1	<0.5	<0.5	<0.5
IM-2	**19.8**	**11.5**	2.12	0.8	2.26	1.2	0.59	<0.5

Well ID	TCE (ug/L)		cis-1,2-DCE (ug/L)		1,1-DCE (ug/L)		1,1-DCA (ug/L)	
	2006	2012	2006	2012	2006	2012	2006	2012
IM-4	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
IM-7	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
IM-10	**107**	**84**	**7.68**	5.2	1.63	0.4 C1,J	1.58	<0.5
IM-11	**64.4**	**67**	3.84	2.7	2.14	1.0	0.53	<0.5
IM-E1	1.89	**8.2**	<0.5	0.3 C1,J	<1	<0.5	<0.5	0.4 C1,J
IM-E3	1.15	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MMW-7	**89.8**	NS	**31.9**	NS	<1	NS	<0.5	NS

Notes:
NS – not sampled because well was decommissioned; < - analyte not detected, reported as less than quantitation limit shown; C1 – reported value is below quantitation limit; J – estimated value that is above the method detection limit but below the limit of quantitation; Bold font indicates the value is above cleanup standard.

Elevated TCE concentrations in excess of one order of magnitude above the MCL persist at wells IM-10 and IM-11, suggesting that in the former source area of the Micro Storage building, attenuation to acceptable levels without active treatment is quite slow and will take tens of years to achieve. Additionally, the elevated concentrations of TCE in shallow groundwater at wells IM-10 and IM-11 on opposing sides of the former Micro Storage building suggest similar concentrations are likely to exist underneath the building, which may be of concern for vapor intrusion since the building is currently worker-occupied.

Groundwater gradients within the shallow A-zone were also evaluated and compared to historical results. Comparison of the A-zone groundwater gradients determined in 2012 to the 2006 results indicates that while the flow direction remains to the northeast and unchanged at these points in time, gradient magnitude appears greater in 2012 by a factor of about eight than in 2006 (barring incorrect 2006 measurements or interpretation, which could not be checked for accuracy). No conclusion can be drawn regarding the B-zone hydraulic gradient because there are insufficient wells to make this determination.

6.5. Site Inspection

Representatives from EPA Region 9 (Mr. Daewon Rojas-Mickelson) and USACE Seattle District (Ms. Leanna Woods Pan and Mr. Jefferey Powers) conducted a site inspection at the IM/MSC Site on January 17, 2012. The purpose of the site inspection was to observe conditions at the IM/MSC Site and the surrounding area. A Site Inspection Checklist was completed and is attached as Appendix D. Overall observations during the site inspection included the lack of active remedy since 1995 or monitoring since 2006. Status of select monitoring wells was determined during the Site Inspection in order to support a

groundwater monitoring event that was conducted in March 2012. Overall, monitoring well conditions were good except water was observed inside several well vaults, indicating deteriorated or absent rubber gasket seals on the flush-mount covers. The site inspection also revealed that many locked well caps could be easily removed by hand, indicating several wells were not fully secured. Results from the groundwater monitoring event have been evaluated and compared to previous sampling events, described in section 6.4, and a report for the event is available in Appendix A.

6.6. Institutional Controls

The 1991 ROD states that a deed restriction shall be filed to prohibit the use of on-site shallow groundwater for drinking water and controlling other subsurface activities. The deed restriction shall remain in place until groundwater cleanup standards are achieved. A deed restriction was recorded in 1991 for the MSC property (USEPA, 1992), prohibiting the use of on-site shallow groundwater for drinking water. To this end, the written deed restriction specifically states, *"No Production Wells, or borings or wells penetrating through the 'A' water bearing zone, may be drilled on the Property without the express prior written approval of the Regional Board and any other agency with jurisdiction."* However, EPA has no evidence that such a deed restriction has been recorded for the IM property. Restriction of wells to be utilized for drinking water is essential to the protectiveness of the remedy until such time that contaminant concentrations in groundwater meet cleanup standards.

As part of this FYR, a title search was completed by USACE. The results of the title search are available in Appendix E. The title search showed there is a deed restriction on one parcel of the Site, the MSC property.

Table 7 lists the ICs associated with areas of interest at the Site.

Table 7. Institutional Controls Summary Table

Media	ICs Called for in the Decision Documents	IC Objective	Instrument in Place
Ground Water	Deed Restriction (1991 ROD)	Restrict shallow ground water use throughout the IM/MSC Site.	1991 Deed Restriction prohibits use of groundwater for drinking water at the MSC property. Currently, EPA has no evidence that a similar deed restriction has been recorded for the IM property.
Surface Water	No	No IC necessary as only groundwater was found to have contaminants at unacceptable risk levels in the 1991 ROD.	None
Soil	No	No IC necessary as only groundwater was found to have contaminants at unacceptable risk levels in the 1991 ROD.	None

6.7. Interviews

During the FYR process, interviews were conducted with parties impacted by the Site, including current and former property owners, and regulatory agencies involved in Site activities or aware of the Site. The purpose of the interviews was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy that have been implemented to date. Interviews were conducted during the Site visit on January 17, 2012 and by telephone on January 23, 2012.

Interviews were conducted during the site inspection with the former property owner and PRP, David Small representing Kimosabe Corporation, and with the current property owner, Bret Sisney representing Devcon Construction Inc. An interview with California Regional Water Quality Control Board representative, David Barr, was also conducted via teleconference on January 23, 2012. David Barr is the RWQCB case manager for the Metropolitan Corporate Center (MCC) site, which is immediately west and partly hydraulically up-gradient/partly cross-gradient from the Micro Storage Corporation (MSC) portion of the site. The common themes and more important issues brought up during the interviews are summarized below and complete interviews with questions and responses are included in Appendix F.

A sentiment consistently expressed by Mr. Small (Kimosabe Corp., a successor entity to Kim Camp III) was that his responsibilities for sampling had been met following site closure with the RWQCB; also that EPA would investigate possible up-gradient contamination and determine a path forward for the Site. The third FYR corroborates Mr. Small's understanding of the potential up-gradient source investigation status, stating in section 5.3.2, "The Water Board, in conjunction with the EPA is further investigating to identify potential off-site sources of VOCs and MTBE migration onto the IM/MSC Site." Mr. Sisney (Devcon Construction Inc., current MSC property owner) was knowledgeable of the Site Superfund status, but much of his information concerning the Site comes newly to him from Mr. Small due to Mr. Sisney's limited experience with the property (sale was complete in January 2012).

Mr. Barr (RWQCB) expressed his opinion that contamination at the Site is not judged as serious as it once was, considering decreased contaminant concentrations at IM/MSC compared to other, more contaminated sites. RWQCB was the IM/MSC Site regulatory agency from 1989 to 2006. The lead oversight role was transferred to EPA in July 2006. EPA and RWQCB communicate with respect to IM/MSC and MCC because of co-mingled contaminant plumes at the property boundary between these two properties. In addition to the property currently occupied by Qualcomm, MCC at one time owned the property immediately south of the IM/MSC Site. That property transferred hands to a currently unknown owner. At the time of this FYR, the building on this property was occupied by Vista Solar (Figure 2). Mr. Barr indicated that he would try to identify the new owner. The property south of IM/MSC is significant because it is potentially up-gradient from MW-1, the most up-gradient well on IM/MSC Site that experienced a marked rise in groundwater contamination prior to 2006.

Mr. Barr does not recall that any agreements were made by regulatory agencies with the former property owner (Kimosabe Corporation) to track down up-gradient sources. Mr. Barr previously discussed potential sampling of wells on MCC property, up-gradient of IM/MSC, with Kimosabe Corporation's remedial contractor (TRC Lowney). While MCC refused to conduct sampling of these wells to support

the IM/MSC project, Kimosabe Corporation indicated that they were willing to sample up-gradient wells on MCC property in lieu of wells on the IM/MSC Site. However, according to Mr. Barr, none of this discussion was ever finalized or put in writing. To the best of Mr. Barr's recollection, the RWQCB never agreed that Kimosabe Corporation stop monitoring at the IM/MSC Site.

7. Technical Assessment

This section evaluates the protectiveness of the implemented remedy at the IM/MSC Site based on data and information presented in the previous section. The technical assessment is based on the responses to three questions set forth in EPA's Five-Year Review guidance.

7.1. Question A: Is the remedy functioning as intended by the decision documents?

The ROD-selected remedy required hydraulic containment of the entire groundwater plume until clean up standards were achieved. From 1991 to 1996, groundwater extraction and treatment reduced VOC concentrations in shallow groundwater, with TCE levels decreasing by more than an order of magnitude. Levels were considered asymptotic or near-asymptotic by the time of the first Five-Year Review in 1996, and the RWQCB allowed KCIII to shut down the treatment system. Additionally, the RWQCB noted in the first Five-Year Review that while groundwater extraction may reduce VOC concentrations and contain plumes, it may not be able to restore VOC-contaminated aquifers to background or drinking-water quality (USEPA 1996). The ROD-selected remedy has not been revised via an Explanation of Significant Difference or a ROD amendment update the remedy, and current contaminant concentrations do not meet cleanup standards throughout the Site.

The remedy also included periodic groundwater monitoring. Groundwater was sampled at least biannually (except in 2005) up until 2006. Overall, monitoring during that time demonstrated that the VOC plume was stable or decreasing (TRC Lowney, 2006). Instances of increased VOC concentrations and the appearance of MTBE in some wells were suspected to be attributable to an up-gradient off-site source. However, existence of such a potential source has not been investigated. Groundwater sampling was discontinued after 2006, prompting the completion of a single sampling effort in March 2012 to support this FYR. Currently, there is no active groundwater monitoring program established for the Site.

A deed restriction was required as part of the remedy to prevent ingestion or other direct exposure to the shallow groundwater. A 1991 deed associated with the MSC property prohibits use of on-site shallow groundwater for drinking water (USEPA 1992). EPA has no evidence that a similar deed restriction has been recorded for the IM property.

7.2. Question B: Are the exposure assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

Changes in Standards and Toxicity-Based Concentrations (TBCs)

The majority of MCLs that were selected as ARARs have remained unchanged from the date of the original ROD (25 September 1991). For specific chemicals (1,1-dichloroethane, Freon 113, dichloromethane, and 1,1,2-trichloroethane), only proposed MCLs or MCLGs were available at the time

the ROD was signed. MCLs for some of these chemicals have since been promulgated. The evaluation of changes in the MCLs in the ROD for the IM/MSC Superfund Site indicates that those changes do not appear to impact the protectiveness of the remedy.

Changes in Exposure Pathways

Currently, the land use on site remains light industrial. Vapor intrusion from groundwater to indoor air was not identified as an exposure route in the 1991 ROD. Because of the elevated TCE concentrations at the Site, vapor intrusion may affect the protectiveness of the remedy

Changes in Toxicity and Other Contaminant Characteristics

Toxicity factors for PCE, TCE, cis 1,2-DCE, and 1,1,1-TCA have changed since the 1991 ROD and subsequent to the last FYR. These changes do not affect the long-term protectiveness of the remedy as the ROD cleanup levels are still considered to be protective and no one is currently drinking the contaminated groundwater. The change in the TCE toxicity factors may have an impact on whether vapor intrusion is posing a potential risk to human health for workers in buildings at the Site.

Changes in Risk Assessment Methods

No changes to standardized risk assessment methodologies have occurred.

Expected Progress Towards Meeting Remedial Action Objectives (RAOs)

Remedial Action Objectives (RAOs) were not explicitly included in the ROD. However, the remedy when operating made progress towards restoring the groundwater to beneficial use.

7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?

No other information has surfaced that would call into question the protectiveness of the remedy at the IM/MSC Site.

7.4. Technical Assessment Summary

The selected remedy included a groundwater extraction and treatment system, which has not operated since 1996 as a result of RWQCB agreement that contaminant concentrations had reached asymptotic or near-asymptotic levels. Groundwater monitoring was conducted until 2006, at which time cleanup goals had not been met and there was question as to whether an up-gradient source was impacting the Site. A single groundwater monitoring event conducted in support of this FYR suggests that contaminant concentrations are decreasing at the Site, yet levels are still above cleanup goals and no future monitoring is currently planned at the Site. The de facto remedy at the Site is MNA, but this remedy has not been formally adopted in an ESD or ROD amendment. A deed restriction is associated with the MSC property, restricting shallow groundwater use, but EPA does not have evidence to suggest that a similar deed restriction has been recorded for the IM property.

Changes in the MCL values corresponding to the ARARs in the ROD do not affect the protectiveness of the remedy. Exposure pathways identified in the ROD have not changed. However, vapor intrusion was not identified as an exposure route in the ROD, and TCE in groundwater is at concentrations where vapor intrusion may affect the protectiveness of the remedy.

8. Issues

Table 8 summarizes the current issues for the IM/MSC Site.

Table 8. Current Issues for the IM/MSC Site

Issue	Affects Current Protectiveness (Yes or No)	Affects Future Protectiveness (Yes or No)
Potential vapor intrusion impacts to office workers at the IM/MSC Site have not been evaluated. Offices are located above shallow VOC groundwater contamination.	Yes	Yes
EPA has no evidence that a deed restriction has been recorded for the IM property.	No	Yes
No formal action (ESD or ROD Amendment) has been taken to evaluate and select an updated remedy to replace pump and treat for the site. MNA may be a valid approach, based on decreasing contaminant concentrations, but needs to be formally evaluated.	No	Yes

9. Recommendations and Follow-up Actions

Table 9 provides recommendations to address the current issues at the IM/MSC Site.

Table 9. Recommendations to Address Current Issues at the IM/MSC Site

Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date
Evaluate potential vapor intrusion	Conduct indoor air sampling in buildings at the site to assess whether vapor intrusion is occurring.	PRP	EPA	10/ 2013
Lack of evidence that a deed restriction has been recorded for the IM property	File deed restriction for IM property	RWQCB	EPA	09/2014
Officially document updated Site remedy	Prepare a ROD amendment or ESD (and underlying support documentation) to evaluate and, if appropriate, select a new remedy for the site.	EPA (decision document) PRP (evaluation of alternatives including MNA)	EPA EPA	06/2014 03/2014

In addition, the following are recommendations that improve management and assessment but do not affect current protectiveness and were identified during the five-year review:

- The periodic groundwater monitoring program that was discontinued in 2006 must resume because current contaminant levels remain above cleanup standards. The intent of the RWQCB decision to end active groundwater extraction and treatment was to shift to a passive, monitored natural attenuation (MNA) remedy. Inherent in an MNA remedy is the requirement for performance monitoring; that is, to sample groundwater, not only for contaminants of concern but MNA-specific indicator parameters such as nutrients, electron donors and acceptors, co-metabolites and metabolic byproducts, and perhaps microbial testing results. MNA monitoring is often more encompassing and rigorous than other types of groundwater monitoring because of the need to determine if geochemical conditions are supportive of natural attenuation processes including sorption, abiotic degradation, and biodegradation.

- There is uncertainty as to whether an up-gradient source is impacting Site groundwater. RWQCB is the lead oversight agency for cleanup activities at the up-gradient property (MCC) and should seek to ensure that the PRP(s) for the up-gradient property are held responsible for taking steps to ensure that contamination does not leave their Site in sufficient quantities to negatively impact the IM/MCS cleanup effort. March 2012 sampling results suggest that contaminant concentrations in the most up-gradient well on Site (MW-1) decreased, indicating that such a potential up-gradient source is not a continuous, long-term source.

- The location of monitoring well MMW-7 should be determined. According to Site maps, this well should be located on the border between the MSC and MCC properties. This well should be included in future sampling programs or its abandonment should be verified (see Appendix A, in the section on Deviations from QAPP).

- A new well lock should be used to secure each monitoring well. Keys to these locks should be retained by the PRP for future sampling and should be accessible by EPA.

10. Protectiveness Statements

A protectiveness determination of the remedy at the IM/MSC Site cannot be made until a vapor intrusion assessment is complete. It is expected that this action will be completed by October 2013, at which time a protectiveness determination will be made via an addendum to the Fourth Five-Year Review. In addition, to be protective in the long term, the following actions need to be completed: a deed restriction that prevents the use of Site shallow groundwater for drinking water needs to be placed on the IM property; and a ROD Amendment or ESD is required to select an updated remedy to replace pump and treat as the remedy for the Site.

11. Next Review

This is a policy Site that requires ongoing FYRs as long as waste is left on site that does not allow for unrestricted use and unlimited exposure. The next FYR will be due within five years of the signature date of this FYR.

Appendix A: Data Evaluation Technical Memorandum

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Technical Memorandum
Data Evaluation for March 2012 Groundwater Monitoring Event
Intel Magnetics/Micro Storage Corporation Fourth Five-Year Review Report
26 June 2012

Introduction

The Fourth Five-Year Review is currently being conducted for the Intel Magnetics/Micro Storage Corporation Superfund Site (IM/MSC Site), with a completion date scheduled for September 2012. Semi-annual groundwater monitoring by the PRP's remedial contractor ceased at the IM/MSC Site in August 2006. Because the current period for this Five-Year Review covers 2007-2012, and also because the principal remaining component of the Site remedy is groundwater monitoring, a single groundwater monitoring event was conducted by the USACE Seattle District as part of the current Five-Year Review in order to evaluate current remedy progress and protectiveness.

Fourteen groundwater monitoring wells were sampled at the IM/MSC Site on March 12-13 and 26-27, 2012; deployment of sampling devices occurred on March 12-13, while retrieval of devices and sample collection and shipment to the laboratory occurred on March 26-27. Monitoring included analysis of groundwater for volatile organic compounds (VOCs) by the EPA Region 9 Analytical Laboratory in Richmond, California. Sampling for VOCs was conducted in order to compare results to previous results and qualitatively evaluate chemical fate and transport at the Site. Total Dissolved Solids (TDS) and anions – including fluoride, chloride, nitrite, bromide, nitrate, phosphate, and sulfate – were also analyzed at EPA Region 9 Lab. Field geochemical parameters of dissolved oxygen (DO), oxygen reduction potential (ORP), pH, and specific conductivity were also measured and recorded during sample collection. Additionally, the monitoring event included water level collection and elevation contouring as well as in-well displacement testing.

Methods

Sampling Technique

Passive diffusion bag samplers (PDBs) were chosen as the sampling method to best preserve volatile organic compounds, particularly TCE which is the principal remaining contaminant of concern on Site, while at the same time streamlining mobilization and minimizing investigative-derived waste. The PDBs were obtained from Columbia Analytical Services (CAS) and consisted of 36-inch long by 1-1/4-inch diameter low-density polyethylene bags pre-filled at CAS Laboratory with 330 milliliters (mL) of ASTM Type II certified, laboratory-grade, analyte-free deionized water. The pore size of the low-density polyethylene bags is 10 angstroms or less.

The PDBs were deployed on 13 March 2012 within the screened intervals of the monitored wells such that there was one PDB for each approximately five-foot segment of well screen. Since well screens varied in length from five to 17 feet, between one and three PDBs were utilized per well.

PDBs were affixed to a stainless steel wire assembly at the approximate depths pre-designated in the QAPP with stainless steel connections, and the supporting wire was weighted with stainless steel weights at the bottom of the assembly to counteract the wire assembly buoyancy and to

position the bags at the desired depths in each well. First, each well was opened and depth to static groundwater was measured and recorded using an electronic water level meter. Well depths were also verified by "feeling" for the bottom of the well with the probe of the water level meter. The PDB assemblies were placed down each well to the targeted depths, and secured to the top of each well so they remained at the same depth throughout the monitoring period.

PDBs were retrieved from the wells and analytical samples collected on 26 March 2012, approximately 13.5 days after deployment. From each PDB sampler, the VOC samples were collected first into 40 mL VOA vials, followed by measurement of field parameters using a flow-through cell. Excess sample water was combined and placed in a one liter amber bottle for TDS and anions testing. See **Table A-1** for a cross-key relating sample identification number ("sample ID") to well ID. PDBs were deployed and retrieved as indicated in the Standard Operating Procedure included in the quality assurance project plan (QAPP), Appendix D.

All down-hole equipment was clean prior to use and was either disposable (steel wire assemblies, spent PDBs) or was decontaminated between wells (water level meter, displacement slug used for two wells as explained later) with phosphate-free detergent and tap water rinses as described in the QAPP. Additionally, sampling personnel donned new nitrile gloves when sampling each successive well.

Analytical Methods

Volatile organic compounds (VOCs) were analyzed using EPA Method 524.2/SOP 354. The project analyte list included the following:

- Trichloroethene (TCE),
- Trichlorofluoromethane,
- 1,1-Dichloroethene (1,1-DCE),
- 1,2,2-Trichloro-1,2,2-trifluoroethane (Freon 113),
- Dichloromethane (DCM),
- trans-1,2-Dichloroethene (trans-1,2-DCE),
- 1,1-Dichloroethane (1,1-DCA),
- Cis-1,2-Dichloroethene (cis-1,2-DCE),
- Chloroform,
- 1,1,1-Trichloroethane (1,1,1-TCA),
- Benzene,
- Toluene,
- 1,1,2-Trichloroethane (1,1,2-TCA), and
- Tetrachloroethylene (PCE)

The most prevalent VOC in recent sampling history has been TCE.

TDS were analyzed by APHA/EPA Methods 2540C/SOP 461. Anions were analyzed by APHA/EPA Methods 300.0/SOP 530.

A focused analytical data review was performed by the EPA Region 9 Quality Assurance Office.

When there are multiple PDBs deployed within a single well screen, and particularly when comparing PDB results to those obtained using more disruptive sampling methods like submersible pumps or bailers (as was done at the IM/MSC Site in 2006 and before), the *User's Guide for PDB*

Samplers to Obtain Volatile Organic Compound Concentrations in Wells (USGS, 2001) suggests averaging the results of multiple PDBs. **Table A-1** lists the individual PDB results by well, as well as the average result when project analytes were detected at any one well.

Hydraulic Gradient Determination

Depth to groundwater measurements were collected both during PDB deployment on 12 March and during retrieval on 26 March 2012. The purpose of groundwater level monitoring is to determine hydraulic gradient and compare 2012 results to those results obtained during the last monitoring event in 2006. Depths were measured referencing the top of well casing and converted to elevations above mean sea level based on survey data as reported in Table 2 of the *Third Quarter 1991 Sampling Report* (Lowney Associates, October 1991). Groundwater elevation contours were determined for the A-zone for the two measurement dates and overlaid onto a single map. See **Table A-2** for groundwater depth and elevation data, and **Figure A-1** for groundwater elevation contouring.

Displacement Testing

A displacement test was performed at each well to ensure the well screen was open to the native formation and was not clogged with sediment. A displacement test is conducted by displacing water in a well by inserting or removing an object with a known volume, and measuring the depth to water before and after displacement. If before and after water level readings are the same or nearly so within a short period of time, this means formation water has equilibrated with well water by moving into or out of the well such that hydraulic heads are equal.

In all but two wells, displacement tests were conducted on 26 March using the PDB bags as the displacing volume. This was done by measuring static depth to water prior to removing the PDB assemblies from each well during sampling, then measuring depth to water post-PDB removal. At wells IM-4 and IM-7, displacement testing was conducted on 27 March using a 1"x14" galvanized pipe with galvanized end caps as the displacement device. The galvanized pipe was utilized at these wells because the PDBs had already been removed from the wells without having performed a displacement test. Depending on the number of PDB bags, well diameter, and whether the galvanized pipe was used, theoretical displacements in wells ranged from 0.08 to 3.51 feet. Water level changes within this range were detectable since an electronic water level meter with 0.01-foot incremental markings was utilized. See **Table A-3** for theoretical water displacements for each well tested.

Deviations from the QAPP

There were several minor deviations from the QAPP when compared to field or lab implementation. Each deviation, along with its reason and impact, are described below.

The PDB steel line assemblies purchased from the PDB manufacturer were lost in transit during shipping; therefore the field team purchased steel line, connectors, and weights at a local hardware store to make the assemblies on the first day of deployment. The field-purchased material was new stainless steel and did not affect the quality of the data.

Sampling of well MMW-7 was intended; however, the well could not be located after multiple attempts and hence could not be sampled. This well is believed to have been decommissioned

sometime between 2006 (the last time the well was known to have been sampled) and 2012. The sampling team found a flush-mounted vault filled in with a concrete patch in the vicinity of where MMW-7 was formerly located. MMW-7 was located cross-gradient to the former IM/MSC source areas but it did experience a relatively high TCE concentration of 89.8 µg/L in 2006. The elevated TCE in 2006 was thought to be attributable to the same off-site source that caused elevated concentrations in upgradient well MW-1; therefore, while data at the location of former well MMW-7 would have been beneficial, it was not critical.

There were minor discrepancies between where the mid-point of each PDB was targeted, as depicted in Table B 1-1 of the QAPP, and where the PDB mid-points were actually deployed. Depth differences ranged from no difference (for 4 PDBs) to -1.7 feet (e.g., 1.7 feet shallower than target) at the middle PDB at MW-8. The average difference was just -0.3 feet. The reason most PDBs were deployed at slightly shallower depths than what was targeted was to account for extra room beneath the bottom PDB in each well for the assembly weights. The PDBs all remained within the screened intervals of each well; therefore, this deviation did not adversely affect results.

Due to miscommunication between field and office personnel, the displacement tests were not conducted during PDB deployment as indicated in the SOP. These tests were conducted when the samples were retrieved in the same manner as would have been done during deployment. At wells IM-4 and IM-7, displacement testing was conducted using a 1"x14" galvanized pipe with galvanized end caps connected to steel wire as the displacement device. The galvanized pipe was utilized at these wells because the PDBs had already been removed from the wells. Neither the change in schedule of when tests were conducted nor the use of a galvanized slug in lieu of the PDB assembly altered the results in any way.

The target analytical quantitation limits listed in the QAPP were achieved for all analytes except benzene; its target quantitation limit was 0.2 µg/L and the lab's quantitation limit was 0.5 µg/L. This was a deviation from the QAPP but not of concern because all results were below the California MCL of 1 µg/L, and benzene has not been a contaminant of concern in groundwater in recent monitoring rounds due to its high volatility.

Results

Groundwater Gradient

Flow direction and magnitude of shallow (e.g., A-zone) groundwater differed negligibly over the two week period from which data were collected in March 2012. As seen in **Figure A-1**, flow arrows drawn perpendicular to the white (12 March data) and yellow (26 March data) equipotential lines are from southwest to northeast throughout the Site. Gradient magnitude, defined as vertical hydraulic head differential divided by horizontal distance, was determined to be 0.016 ft/ft and 0.017 ft/ft at the center of the Site on 12 and 26 March, respectively. The observed flow direction was found to be very similar to historical groundwater flow direction as depicted in **Figure A-2**, taken from the *Second Semi-Annual 2006 Ground Water Monitoring Report* (TRC Lowney, October 2006). The flow gradient magnitude; however, was approximately eight times greater in 2012 compared to that depicted in the 2006 report. Because of the finer-grained composition of the Site A-zone aquifer, contaminant transport velocities are likely to remain low. In 2012, as in 2006, B-zone flow direction and magnitude could not be determined because only two B-zone wells were available for monitoring.

Actual 2012 groundwater elevations were comparable to historical elevations, and were within 0.1-foot of the values recorded in 2006 in the A-zone, and within 0.8-foot in the B-zone. Despite the gradient magnitude differences mentioned earlier, the overall direction and the generally low velocity of contaminant movement within the A-zone remains largely as it was in 2006.

Displacement Testing

Displacement testing results showed all monitored wells to be in good communication with native groundwater and that no well screens appear to be clogged due to sediment accumulation, biofouling, or other mechanisms. **Table A-3** shows static, pre-displacement test depth to groundwater, post-test depth to groundwater, theoretical displacement, and percent of static depth to groundwater recovered between the two groundwater measurements. The results indicate that over the approximate 10 to 15 minute period over which samples were collected, the displaced volume of well water returned to within 92% to 103% of static levels based on theoretical displacement magnitudes.

Analytical Results

Overall, concentrations of contaminants that exceeded cleanup criteria in 2006 have notably declined based on the March 2012 results. By far the most prevalent contaminant continues to be TCE, detected at nine of 14 sampled wells, and exceeding the MCL of 5 µg/L at eight of those wells. The most notable decline in TCE, from 224 µg/L in 2006 to 8.6 µg/L in 2012, was observed at upgradient well MW-1. Note that, as discussed earlier under *Methods*, the average PDB concentration is referred to when there were detections of that analyte in multiple PDBs in a single well. TCE at MW-4, also considered up-gradient from the IM and MSC source areas, also declined from 10.9 ug/L to 8.9 ug/L. See **Figure A-3** for a spatial depiction of March 2012 TCE results, and **Figure A-4** for 2006 TCE results for comparison.

The well exhibiting the highest TCE concentration, at 84 µg/L, is IM-10, located immediately north of the former Micro Storage building. The well with the second-highest TCE concentration is IM-11 (67 µg/L), located within approximately 75 feet of the northwestern edge of the same building. Both of these wells monitor shallow groundwater that is approximately 7-8 feet below land surface. The pattern of highest concentrations within close proximity to this building suggests that similar concentrations may be expected in shallow groundwater beneath or near the building's footprint.

Two of three first-order reductive dechlorination products of TCE, 1,1-DCE and cis-1,2-DCE, were found present at the Site. 1,1-DCE was detected at three wells, ranging in concentration from 1.0 to 7.7 µg/L. Cis-1,2-DCE was detected at five wells, ranging in concentration from 0.8 to 5.2 µg/L. The third direct degradation product of TCE, trans-1,2-DCE, was detected at an estimated value of 0.3 µg/L, below the quantitation limit, at two wells. See **Table A-1** for these results. Concentration comparisons between 2012 and 2006 are made in **Table A-4**, and include TCE and its degradation products, plus 1,1-DCA. Vinyl chloride was absent from all Site wells analyzed in March 2012. **Table A-5** depicts the remaining project analytes detected in either 2012 or 2006 that did not exceed cleanup standards. These analytes include Freon 113, PCE, and 1,1,1-TCA. While relatively low concentrations were observed in 2006, those concentrations declined further in 2012.

Results clearly indicated there were no large, depth-dependent variations in analyte concentrations. In all cases where multiple PDBs were deployed in a well, the individual contaminant concentration was very similar to concentration of the same anlayte in the other PDBs at different depths, and to the average of all PDBs in that well as a whole.

Acetone was detected at concentrations ranging from 2.0 to 15 µg/L at all but one well; however, it was also detected in the Trip Blank at the same approximate concentration (9.1 ug/L). Acetone is oftentimes associated with laboratory contamination. Since the Trip Blank sample was obtained from a PDB manufactured by CAS Laboratory that was not deployed in a well, acetone was determined to probably be a contaminant present in the lab-grade water used by CAS Laboratory to fill the PDBs. No other VOC was detected in the Trip Blank.

The Performance Evaluation (PE) sample detected all project analytes except 1,1,2-TCA. The PE results were reviewed for accuracy as part of the focused data review by the EPA Region 9 Quality Assurance Office, with no anomalous results noted.

Total dissolved solids (TDS) and anions of fluoride, chloride, nitrite as N, bromide, nitrate as N, o-phosphate as P, and sulfate were also analyzed from each well using the remaining volume from each PDB combined into a single, composite sample for each well. TDS results were non-detect (<20 mg/L) at all sampled wells, as were fluoride, nitrite, bromide, nitrate (<0.1 mg/L), chloride, o-phosphate (<1 mg/L), and sulfate (<0.5 mg/L). TDS and anions could not be analyzed at well IM-10 because after the 40-ml VOA vials were filled for primary and field duplicates, there was insufficient remaining sample volume to be analyzed. Non-detect values for these parameters are due to the fact that the pore size of the light-density polyethylene PDB material is only about 10 angstroms or less; of insufficient size to allow hydrophilic polar molecules, such as inorganic ions which have larger molecular sizes, to pass through the bag into the sample water. Therefore, anions results are not considered representative of native groundwater, and were not used in subsequent groundwater quality evaluation.

Water quality field parameter results measured with a QED MP 20 Flow Cell demonstrated generally low dissolved oxygen (0.8 to 5.7 ppm), low specific conductivity (0.004 to 0.01 millisiemens), moderately low pH (5.2 to 5.7 pH units), and somewhat high oxygen reduction potential (101 to 147 millivolts) indicative of oxidizing groundwater geochemistry. See **Table A-6** for water quality field parameter results. The average dissolved oxygen of all groundwater measured was about 3 ppm, a relatively low value which may indicate some biological demand. To what extent diffusion may have been limited between formation water and the water inside the PDB samplers for some of these parameters is unknown; however, the low specific conductivity values appear to corroborate the low TDS measurements from the Region 9 Lab.

The focused laboratory data review determined that, for the purposes of a qualitative screening, the VOC, TDS, anions, and water quality parameters are considered usable, and that that measurements of target analytes in groundwater samples documented in the data packages are accurate as defined by the project QAPP.

Conclusions

Well screens of the 14 wells tested appear to be unclogged and in direct communication with native groundwater based on displacement test results. Thus, in turn, groundwater samples collected from these wells should be representative of native groundwater.

Because contaminant concentrations were so similar between samples collected from different PDBs and different depths in multiple-PDB wells, one can infer that there are no stark differences in permeability within the screened intervals of each individual well; otherwise, lower concentrations

might be expected in PDBs intercepting higher permeability zones that have substantially flushed contaminants through with a higher groundwater flux.

Use of PDBs as the sampling methodology for VOCs in Site groundwater, and particularly for the VOCs found present in 2006 (TCE, 1,1-DCE, cis-1,2-DCE, 1,1-DCA, PCE, 1,1,1-TCA, and Freon 113), is a simple, effective, and relatively accurate means of assessing groundwater contaminant concentrations. It is a passive sampling method because no purging is required. By contrast, Site wells in 2006 and before were sampled using a combination of down-well submersible (Grundfos-type) pumps and bailers (and no distinction was made between which wells were sampled with pumps vs. bailers), which are sampling methods which agitate well water and potentially volatilize contaminants of concern. Comparison of the current sampling method to previous methods assumes that the PDB method may provide more accurate, less disturbed VOC results, and that results from previous methods may have been biased low. This qualitative conclusion cannot be quantified without in-well studies comparing the different sampling techniques over a simultaneous sampling period, which was beyond the scope of this Five-Year Review sampling effort.

Elevated concentrations of TCE in shallow groundwater at wells IM-10 and IM-11 on opposing sides of the former Micro Storage building suggest similar concentrations are likely to exist underneath the building, which may be of concern for vapor intrusion since the building is currently worker-occupied.

Comparison of the A-zone groundwater gradients determined in 2012 to the 2006 results indicates that while the flow direction remains to the northeast and unchanged at these points in time, gradient magnitude appears greater in 2012 by a factor of about eight than in 2006 (barring incorrect 2006 measurements or interpretation, which could not be checked for accuracy). No conclusion can be drawn regarding the B-zone hydraulic gradient because there are insufficient wells to make this determination.

Based on 2012 results, VOC contaminant concentrations have decreased modestly at most wells since 2006. Three project anlaytes continue to exceed cleanup criteria: TCE, 1,1-DCE, and 1,1-DCA. TCE in excess of 5 µg/L was observed at upgradient wells MW-1, MW-4 and MW-6, and former source area wells IM-1, IM-2, IM-10, IM-11, and IM-E1. The highest TCE concentration in 2012 was 84 µg/L at IM-10. 1,1-DCA was found in excess of 5 µg/L at upgradient well MW-6, as was 1,1-DCE in excess of 4 µg/L. There is some evidence of TCE reductive dechlorination with the presence of breakdown products 1,1-DCE and cis-1,2-DCE present in wells which also have TCE.

The relatively high, up-gradient TCE concentration that was observed in upgradient wells, particularly at MW-1, during 2006, has likely been degraded as well as transported and dispersed to farther down-gradient locations as evidenced by lower TCE concentrations at nearly all locations. The marked decrease in TCE at MW-1 from 224 to 8.6 µg/L between 2006 and 2012 likely indicates that potential up-gradient contamination is not a continuous, long-term source.

Table A-1. Results Summary for Project Analytes, IM/MSC Groundwater Sampling for FYR

Well ID	PDB Depth (midpoint of 3' bag)	Sample ID	Trichloro-fluoro-methane	1,1-Dichloro-ethene (1,1-DCE)	1,2,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	Dichloro-methane (DCM)	trans-1,2-Dichloroethene (trans-1,2-DCE)	1,1-Dichloro-ethane (1,1-DCA)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	Chloroform	1,1,1-Trichloro-ethane (1,1,1-TCA)	Benzene	Trichloro-ethene (TCE)	Toluene	1,1,2-Trichloro-ethane (1,1,2-TCA)	Tetrachloro-ethene (PCE)
		Cleanup Standard		4	1200	40	10	5	6	100	200	1	5	100	32	5
MW-1	upper (12.1' bgs)	0312MAG10601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.0**	<0.5	<0.5	<0.5	**8.5**	<0.5	<0.5	<0.5
	upper - field dupe	0312MAG10602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.1**	<0.5	<0.5	<0.5	**8.8**	<0.5	<0.5	<0.5
	lower (17.1' bgs)	0312MAG15603	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.0**	<0.5	<0.5	<0.5	**8.6**	<0.5	<0.5	<0.5
	average	N/A							**1.0**				**8.6**			
MW-4	single (18.1' bgs)	0312MAG16605	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**8.9**	<0.5	<0.5	<0.5
MW-5	upper (23.3' bgs)	0312MAG21806	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	lower (26.8' bgs)	0312MAG25307	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-6	upper (10.0' bgs)	0312MAG08509	<0.5	**7.8**	**13**	<0.5	<0.5	**17**	**3.7**	<0.5	<0.5	<0.5	**37**	<0.5	<0.5	<0.5
	upper - field dupe	0312MAG08510	<0.5	**7.7**	**13**	<0.5	<0.5	**16**	**3.5**	<0.5	<0.5	<0.5	**37**	<0.5	<0.5	<0.5
	lower (14.8' bgs)	0312MAG13311	<0.5	**7.6**	**13**	<0.5	<0.5	**16**	**3.5**	<0.5	<0.5	<0.5	**39**	<0.5	<0.5	<0.5
	average	N/A		**7.7**	**13**			**16.3**	**3.6**				**37.7**			
MW-7	upper (12.5' bgs)	0312MAG11013	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	middle (17.5' bgs)	0312MAG16014	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	lower (22.0' bgs)	0312MAG20515	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8	upper (10.1' bgs)	0312MAG08617	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5
	middle (15.6' bgs)	0312MAG14118	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5
	lower (21.1' bgs)	0312MAG19619	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5
	average	N/A											**0.8**			
IM-1	single (8.5' bgs)	0312MAG07021	<0.5	<0.5	**1.3**	<0.5	<0.5	<0.5	**0.2 C1,J**	<0.5	<0.5	<0.5	**7.9**	<0.5	<0.5	<0.5

Well ID	PDB Depth (midpoint of 3' bag)	Sample ID	Trichloro-fluoro-methane	1,1-Dichloro-ethene (1,1-DCE)	1,2,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	Dichloro-methane (DCM)	trans-1,2-Dichloroethene (trans-1,2-DCE)	1,1-Dichloro-ethane (1,1-DCA)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	Chloroform	1,1,1-Trichloro-ethane (1,1,1-TCA)	Benzene	Trichloro-ethene (TCE)	Toluene	1,1,2-Trichloro-ethane (1,1,2-TCA)	Tetrachloro-ethene (PCE)
IM-2	upper (8.5' bgs)	0312MAG07022	<0.5 J,Q4	**1.1**	**8.8**	<0.5	<0.5	<0.5	**0.8**	<0.5	**0.4 C1,J**	<0.5	**11**	<0.5	<0.5	<0.5
	lower (13.0' bgs)	0312MAG11523	<0.5	**1.2**	**8.8**	<0.5	<0.5	<0.5	**0.8**	<0.5	**0.4 C1,J**	<0.5	**12**	<0.5	<0.5	<0.5
	average	N/A		**1.2**	**8.8**				**0.8**		**0.4**		**11.5**			
IM-4	upper (32.2' bgs)	0312MAG30725	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	lower (38.1' bgs)	0312MAG36626	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
IM-7	upper (22.0' bgs)	0312MAG20528	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	lower (26.8' bgs)	0312MAG25329	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
IM-10	single (16.6' bgs)	0312MAG15131	<0.5	**0.4 C1,J**	**1.3**	<0.5	**0.3 C1,J**	<0.5	**5.1**	<0.5	**0.4 C1,J**	<0.5	**84**	<0.5	<0.5	<0.5
	single - field dupe	0312MAG15132	<0.5	<0.5	**1.5**	<0.5	**0.3 C1,J**	<0.5	**5.3**	<0.5	**0.4 C1,J**	<0.5	**84**	<0.5	<0.5	<0.5
	average	N/A			**1.4**		**0.3**		**5.2**		**0.4**		**84**			
IM-11	upper (11.2' bgs)	0312MAG09734	<0.5	**1.0**	**3.2**	<0.5	**0.3 C1,J**	<0.5	**2.7**	<0.5	**0.3 C1,J**	<0.5	**67**	<0.5	<0.5	**0.8**
	lower (14.5' bgs)	0312MAG13035	<0.5	**0.9**	**3.0**	<0.5	<0.5	<0.5	**2.7**	<0.5	**0.3 C1,J**	<0.5	**67**	<0.5	<0.5	**0.8**
	average	N/A		**1.0**	**3.1**				**2.7**		**0.3**		**67**			**0.8**
IM-E1	single (11.2' bgs)	0312MAG09737	<0.5	<0.5	**3.6**	<0.5	<0.5	**0.4 C1,J**	**0.3 C1,J**	<0.5	<0.5	<0.5	**8.2**	<0.5	<0.5	<0.5
IM-E3	upper (10.1' bgs)	0312MAG08638	<0.5	<0.5	**2.3**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	lower (14.2' bgs)	0312MAG12739	<0.5	<0.5	**2.3**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	average	N/A			**2.3**											
Trip Blank	Trip Blank	0312MAG70041	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PE	PE	0312MAG80042	**4.5**	**2.4**	**0.9**	**2.4**	**7.7**	**5.5**	**0.9**	**6.3**	**1.1**	**8.1**	**9.7**	**2.0**	<0.5	**5.7**

Notes:

All units are micrograms per liter (ug/L).

Bold data indicates detected value.
Shaded cell indicates exceedance of cleanup standard.
PDB - Passive diffusion bag sampler.

bgs - below ground surface.

N/A - Not applicable.
< - Analyte not detected, reported as less than quantitation limit shown; J - estimated value that is above the method detection limit but below the limit of quantitation; C1 - reported value is below quantitation limit.

Table A-2. Groundwater Elevations During March 2012 Sampling Event

Well ID	Aquifer Zone	Reference Elevation	Depth to Water 3/12/2012	GW Elev. 3/12/2012	Depth to Water 3/26/2012	GW Elev. 3/26/2012
MW-1	A	38.19	6.64	31.55	6.35	31.84
MW-4	A	38.50	7.38	31.12	6.95	31.55
MW-5	B	38.21	6.88	31.33	6.54	31.67
MW-6	A	38.17	6.97	31.20	6.64	31.53
MW-7	A	38.80	8.19	30.61	7.94	30.86
MW-8	A	36.48	6.31	30.17	5.86	30.62
IM-1	A	36.45	6.24	30.21	5.83	30.62
IM-2	A	37.18	6.60	30.58	6.08	31.10
IM-4	B	36.34	3.26	33.08	2.91	33.43
IM-7	A	35.69	7.05	28.64	6.58	29.11
IM-10	A	38.69	7.96	30.73	7.48	31.21
IM-11	A	37.88	7.11	30.77	6.79	31.09
IM-E1	A	36.32	6.20	30.12	5.78	30.54
IM-E3	A	35.65	5.64	30.01	5.17	30.48
MMW-7	A	N/A	N/A	N/A	N/A	N/A

Notes:

1. Reference Elevation is Top of Well Casing Elevation (ft above MSL) from Table 2, Third Quarter 1991 Sampling Report (Lowney Associates, October 1991).

2. No field evidence found for existence of MMW-7; well is assumed to be abandoned hence data not applicable "N/A."

Table A-3. Displacement Test Data Summary During March 2012 Sampling Event

Well ID	Theoretical Water Level Displacement (ft)	Static, Pre-Displacement Depth to Water (ft Below Top of Casing	Post-Displacement DTW (ft BTOC)	% of Static DTW Recovered
MW-1	2.34	6.35	6.37	99.1%
MW-4	1.17	6.95	7.01	94.9%
MW-5	2.34	6.54	6.53	100.4%
MW-6	2.34	6.64	6.64	100.0%
MW-7	3.51	7.94	7.93	100.3%
MW-8	3.51	5.86	5.85	100.3%
IM-1	1.17	5.83	5.83	100.0%
IM-2	2.34	6.08	6.20	94.9%
IM-4	0.29	2.88	2.88	100.0%
IM-7	0.29	6.61	6.61	100.0%
IM-10	1.17	7.48	7.57	92.3%
IM-11	2.34	6.79	6.78	100.4%
IM-E1	0.29	5.78	5.77	103.4%
IM-E3	0.08	5.17	5.17	100.0%
MMW-7	N/A	N/A	N/A	N/A

Notes:

1. Displacement tests conducted 3/26/12 except at IM-4 and IM-7 which were conducted 3/27/12.
2. For all "MW" wells listed, plus IM-1, IM-2, IM-10 and IM-11: Theoretical displacement calculated based on volume of water in 2" well displaced by 1-1/4" x 36" PDB bag, x # bags in well.
3. For IM-E1: Theoretical displacement calculated based on volume of water in 4" well displaced by 1-1/4" x 36" PDB bag, x # bags in well.
4. For IM-E3: Theoretical displacement calculated based on volume of water in 8" well displaced by 1-1/4" x 36" PDB bag, x # bags in well.
5. For IM-4 and IM-7: Theoretical displacement calculated based on volume of water in 2" well displaced by 1" x 14" galvanized steel slug utilized for displacement.

Table A-4. Project Analytes Exceeding Cleanup Criteria in either 2006 or 2012, Results Compared

Well ID	2006 TCE (ug/L)	2012 TCE (ug/L)	2006 cis-1,2-DCE (ug/L)	2012 cis-1,2-DCE (ug/L)	2006 1,1-DCE (ug/L)	2012 1,1-DCE (ug/L)	2006 1,1-DCA (ug/L)	2012 1,1-DCA (ug/L)
MW-1	**224**	**8.6**	**34.9**	1.0	<1	<0.5	<0.5	<0.5
MW-4	**10.9**	**8.9**	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MW-5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MW-6	**56.8**	**37.7**	5.48	3.6	**15.4**	**7.7**	**38.7**	**16.3**
MW-7	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MW-8	2.95	0.8	3.34	<0.5	<1	<0.5	<0.5	<0.5
IM-1	**5.2**	**7.9**	<0.5	0.2 C1,J	<1	<0.5	<0.5	<0.5
IM-2	**19.8**	**11.5**	2.12	0.8	2.26	1.2	0.59	<0.5
IM-4	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
IM-7	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
IM-10	**107**	**84**	**7.68**	5.2	1.63	0.4 C1,J	1.58	<0.5
IM-11	**64.4**	**67**	3.84	2.7	2.14	1.0	0.53	<0.5
IM-E1	1.89	**8.2**	<0.5	0.3 C1,J	<1	<0.5	<0.5	0.4 C1,J
IM-E3	1.15	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
MMW-7	**89.8**	N/S	**31.9**	N/S	<1	N/S	<0.5	N/S

Notes:
N/S – Not sampled (well has been decommissioned).
< - Analyte not detected, reported as less than quantitation limit shown; C1 – reported value is below quantitation limit; J – estimated value that is above the method detection limit but below the limit of quantitation.
Bold indicates above cleanup standard.

Table A-5. Other Project Analytes Detected in either 2006 or 2012, Results Compared

Well ID	2006 Freon 113 (ug/L)	2012 Freon 113 (ug/L)	2006 PCE (ug/L)	2012 PCE (ug/L)	2006 1,1,1-TCA (ug/L)	2012 1,1,1-TCA (ug/L)
MW-1	2.22	<0.5	0.87	<0.5	<0.5	<0.5
MW-4	<1	<0.5	<0.5	<0.5	<0.5	<0.5
MW-5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-6	105	13	<0.5	<0.5	<0.5	<0.5
MW-7	<1	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8	<1	<0.5	<0.5	<0.5	<0.5	<0.5
IM-1	2.65	1.3	<0.5	<0.5	<0.5	<0.5
IM-2	17.9	8.8	<0.5	<0.5	1.21	0.4 C1,J
IM-4	<1	<0.5	<0.5	<0.5	<0.5	<0.5
IM-7	<1	<0.5	<0.5	<0.5	<0.5	<0.5
IM-10	6.76	1.4	<0.5	<0.5	1.06	0.4 C1,J
IM-11	6.75	3.1	1.55	0.8	0.90	0.3 C1,J
IM-E1	<1	3.6	<0.5	<0.5	<0.5	<0.5
IM-E3	3.14	2.3	<0.5	<0.5	<0.5	<0.5
MMW-7	<1	N/S	<0.5	N/S	<0.5	N/S

Notes:
N/S – Not sampled (well has been decommissioned).
< - Analyte not detected, reported as less than quantitation limit shown; C1 – reported value is below quantitation limit; J – estimated value that is above the method detection limit but below the limit of quantitation.

Table A-6. Water Quality Field Parameter Results

Well ID	Dissolved Oxygen (ppm)	pH (pH units)	Oxygen Reduction Potential (mV)	Specific Conductivity (mS)
IM-7	0.78	5.70	118	0.007
IM-4	2.21	5.56	118	0.004
MW-5	2.63	5.65	107	0.008
MW-7	1.26	5.58	109	0.015
MW-8	1.07	5.15	101	0.014
IM-E3	4.39	5.62	101	0.007
IM-E1	5.67	5.48	138	0.007
IM-1	5.42	5.33	147	0.007
MW-4	5.01	5.34	141	0.009
IM-2	3.26	5.56	116	0.009
IM-11	1.76	5.45	109	0.010
MW-6	1.54	5.28	131	0.008
IM-10	N/A	N/A	N/A	N/A
MW-1	3.91	5.73	110	0.007

Notes:
N/ A – Not applicable/Insufficient sample volume to measure field parameters.
Units: ppm – parts per million; mV – millivolts; mS - milliSiemens

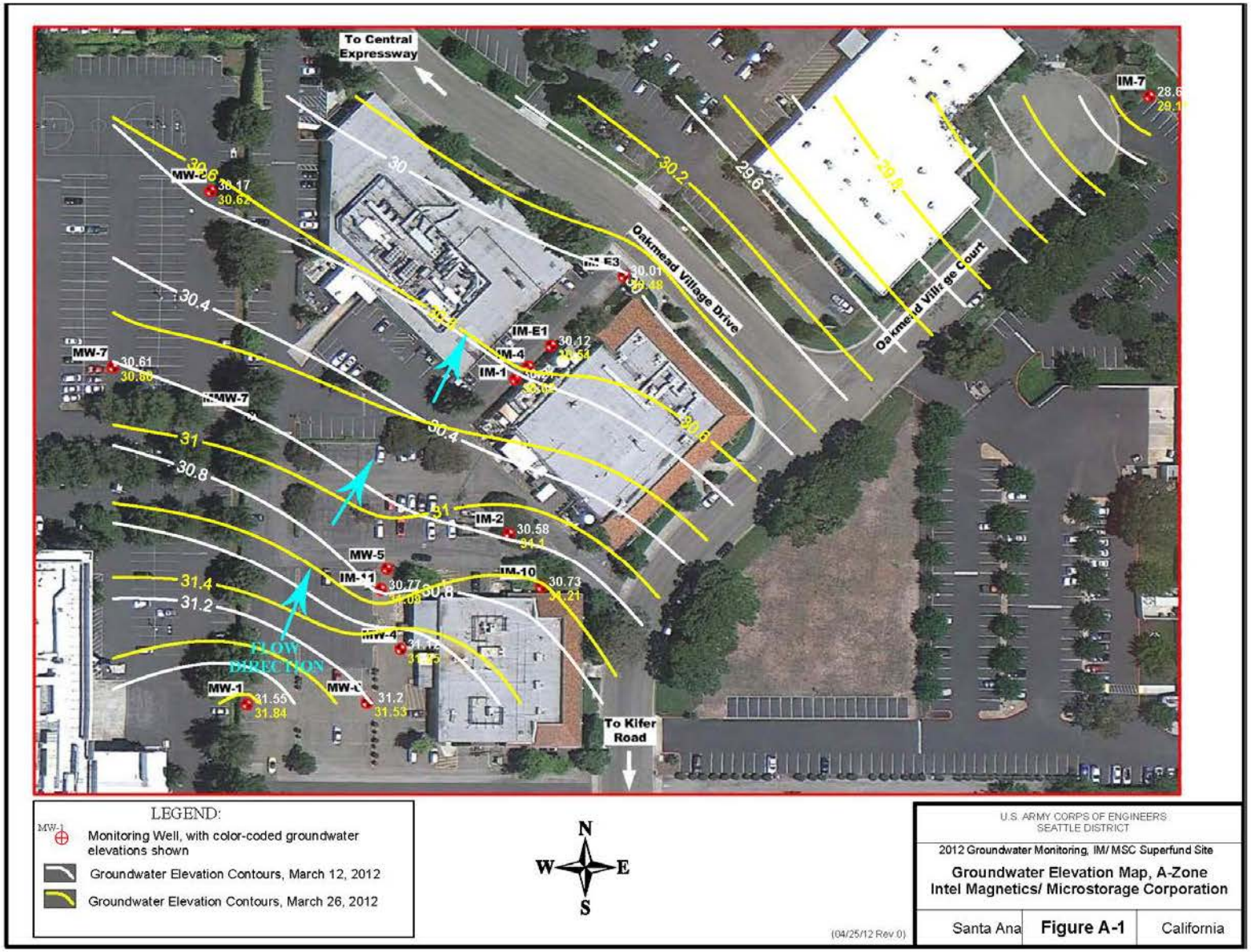

FIGURE A-1. Groundwater Elevation Map in A-zone, March 2012

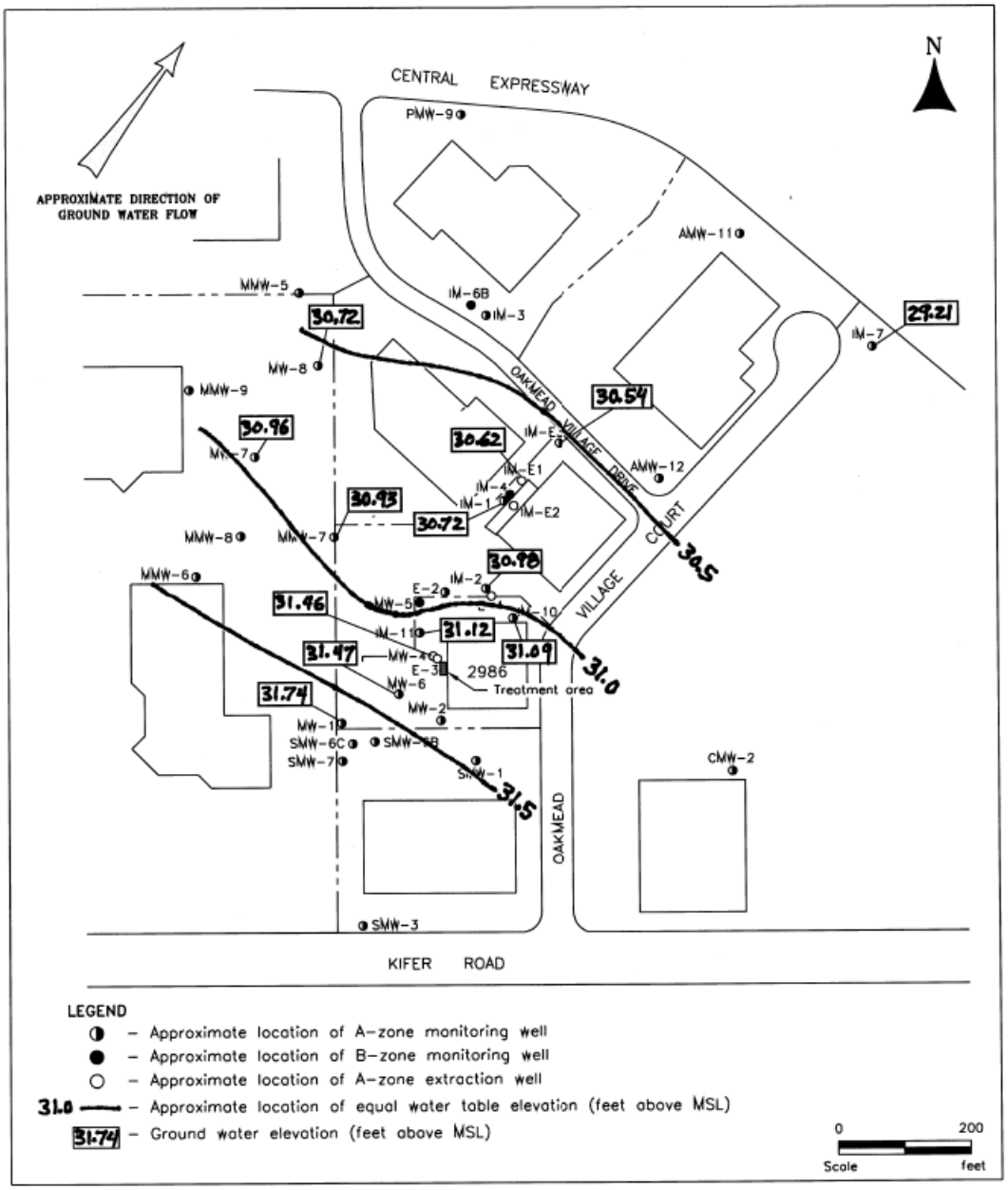

Figure A-2. Groundwater Elevation Map for the A-zone, August 2006 (TRC Lowney 2006)

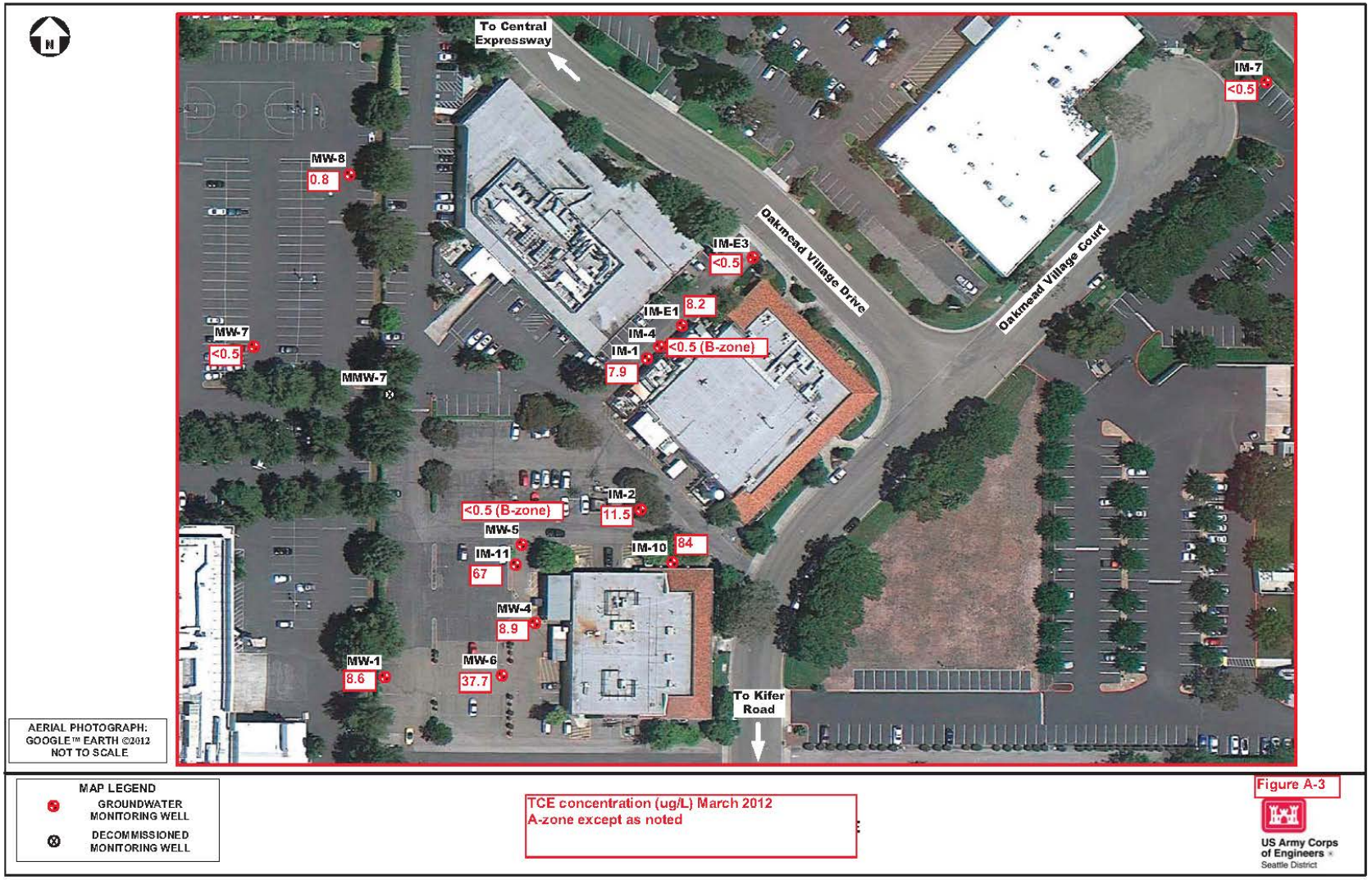

FIGURE A-3. TCE Concentration in the A-zone, March 2012

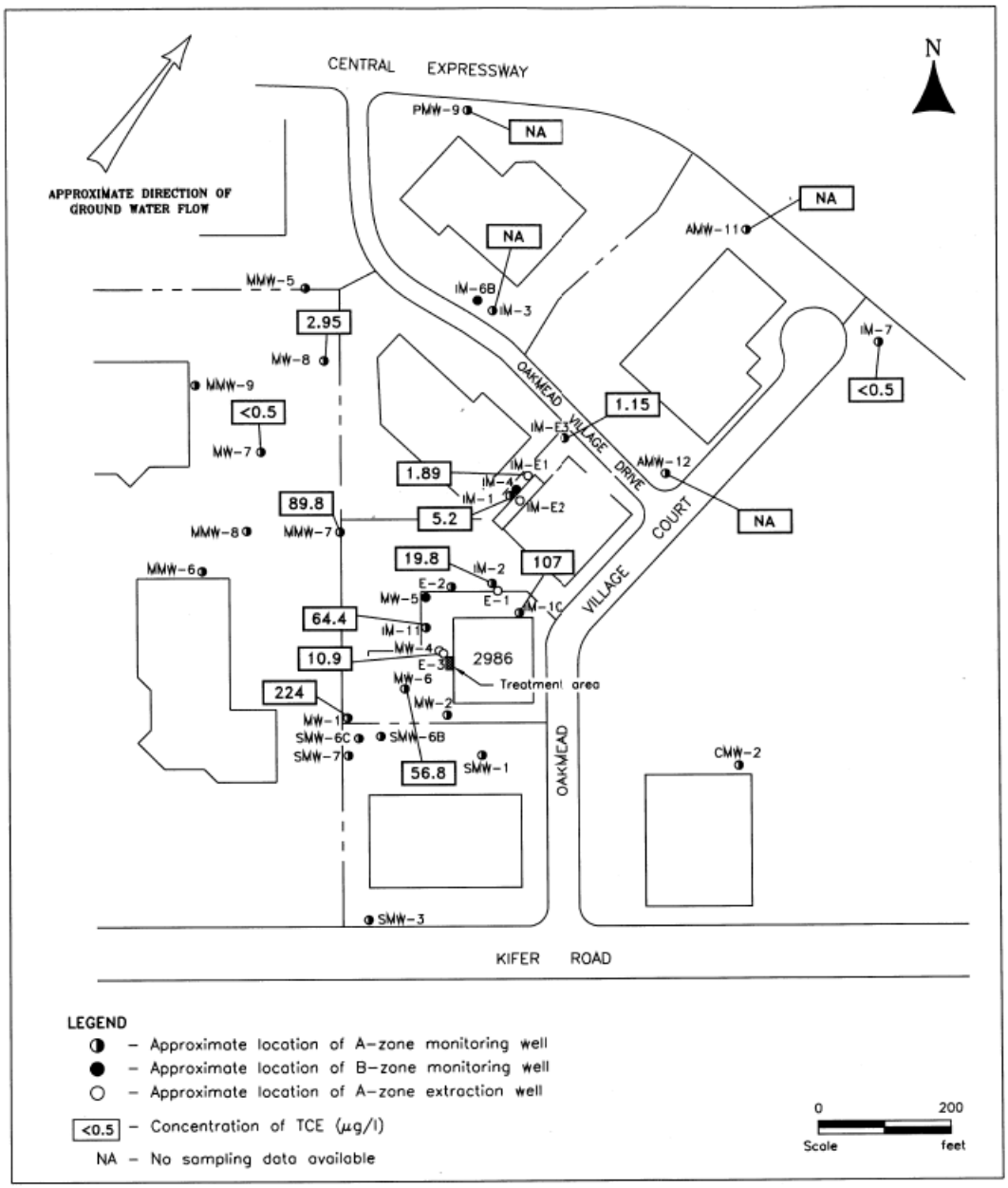

Figure A-4. TCE Distribution in the A-zone, August 2006 (TRC Lowney 2006)

Appendix B: Press Notices

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Press Notices

EPA BEGINS FOURTH REVIEW OF CLEANUP AT
INTEL MAGNETICS/MICRO STORAGE CORPORATION SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) has begun a fourth Five-Year Review of the cleanup at the Intel Magnetics/Micro Storage Corporation Superfund site in Santa Clara, California. This review will evaluate the groundwater remedy at the site to determine if it remains protective of human health and the environment. It will also look at recommendations from prior five-year reviews and whether or not they have been implemented. According to Superfund law, if a cleanup takes more than five years to complete, it will be reviewed every five years until it is complete.

The last Five-Year Review, conducted in 2007, found that the cleanup was protective of human health and the environment. The recommendations made at the time included: continuing groundwater sampling to monitor the plume (which was stable or decreasing but still above cleanup levels in some areas); maintaining institutional controls to prevent direct exposures; issuing an amendment to the 1991 Record of Decision to document a change in the remedy to the current approach of monitored natural attenuation rather than active groundwater extraction and treatment (which became ineffective); recording new restrictive covenants for both properties that are consistent with California law; and continuing to investigate the possibility that groundwater contamination may be migrating onto the site from another off-site location, with the active extraction and treatment system ready for use should it be needed to control stability of the plume.

During this upcoming review process, EPA will study information about the site gathered during the period between 2007 and 2012 and conduct facility inspections and interviews with site personnel. The methods, findings and conclusions from the review will be documented in the Five-Year Review Report to be issued by fall 2012. Upon completion, a copy of the final report will be posted on EPA's website and placed in the information repositories listed below. In addition, a notice summarizing the findings and conclusions will be published in a local newspaper.

EPA invites the community to learn more about this review process and provide input to the Agency. Contact Vicki Rosen, Community Involvement Coordinator, at (415) 972-3244 or rosen.vicki@epa.gov if you have questions or comments about the Intel Magnetics/Micro Storage Corp. cleanup. You can obtain further site information at EPA's website: www.epa.gov/region09/intelmagnetics-microstorage

Information Repositories: EPA maintains information repositories containing Intel Magnetics/Micro Storage Corp. site documents. One is at the Santa Clara City Library, 2635 Homestead Rd., Santa Clara, CA, (408) 615-2900 and the other at EPA's Superfund Records Center, 95 Hawthorne St., San Francisco, CA, (415) 820-4700.

2 col. (4") x 4.5" Santa Clara Weekly

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Appendix C: Documents Reviewed

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Documents Reviewed

AFCEE 2004. *Monitoring and Remediation Optimization Software User's Guide*. Air Force Center for Environmental Excellence.

CDHS 1992. *Public Health Assessment for Micro Storage/Intel Magnetics, Santa Clara, CA, CERCLIS No. CAD092212497*. California Department of Health Services under cooperative agreement with the Agency for Toxic Substances and Disease Registry. October 1992.

GSI 2011. *Preliminary Draft Memorandum: Intel Magnetics Micro-Storage Corporation Long-Term Monitoring Strategy*. Prepared for USEPA Region 9. Prepared by GSI Environmental (GSI), November 2011.

RWQCB 1990. *Final Baseline Public Health Evaluation for the Micro Storage/Intel Magnetics Site, Santa Clara, CA.* Prepared for California Regional Water Quality Control Board. Prepared by Clement Associates, Inc., May 1990.

RWQCB 1996. *Five-Year Review Intel Magnetics/Micro Storage, Santa Clara, CA.* California Regional Water Quality Control Board, San Francisco Bay Region (Water Board). October.

RWQCB 2003. *A Comprehensive Groundwater Protection Evaluation for the South San Francisco Bay Basins*. San Francisco, San Francisco Regional Water Quality Control Board, California Environmental Protection Agency: 251.

Santa Clara 2011. *2010 Urban Water Management Plan*. City of Santa Clara Water Utility. May 2011.

TRC Lowney. 2006. *Second Semi-Annual 2006 Ground Water Monitoring Report.* October 2006.

USEPA 1991. 1991. *Record of Decision: Intel Magnetics/Micro Storage Corporation Superfund Site, EPA 1D: CAD092212497, Santa Clara, CA.* U.S. Environmental Protection Agency Office of Emergency and Remedial Response. August 1991.

USEPA 1992. *Superfund Preliminary Site Close Out Report: Intel Magnetics/Micro Storage, Santa Clara, CA.* United States Environmental Protection Agency (USEPA). 1992.

USEPA, 2001. *Comprehensive Five-Year Review Guidance*. U.S. Environmental Protection Agency Office of Emergency and Remedial Response. June 2001

USEPA 2002a. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*. U.S. Environmental Protection Agency Office of Emergency and Remedial Response. November 2002.

USEPA 2002b. *Second Five-Year Review Report for IM/ MSC Superfund Site, Santa Clara, CA.* United States Environmental Protection Agency. September.

USEPA 2007. *Third Five-Year Review Report for IM/ MSC Superfund Site, Santa Clara, CA.* United States Environmental Protection Agency. September.

USEPA 2011. *Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air-Vapor Intrusion Guidance*. Department of Toxic Substances Control California Environmental Protection Agency. October 2011.

Appendix D: Site Inspection Checklist and Site Photos

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Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

I. Site Information
II. Interviews
III. On-site Documents & Records Verified
IV. O&M Costs
V. Access and Institutional Controls
VI. General Site Conditions
VII. Landfill Covers
VIII. Vertical Barrier Walls
IX. Groundwater/Surface Water Remedies
X. Other Remedies
XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Intel Magnetics/Micro Storage Corporation Superfund Site	**Date of inspection: January 17, 2012**
Location: Santa Clara, CA	**EPA ID: CAD092212497**
Agency, office, or company leading the five-year review: EPA	**Weather/temperature** **Sunny, approximately 50 degrees F**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other: _____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) ☒ Report attached (IM_FYR interview questions).

- Former Property Owner & PRP (Kimosabe Corp., a successor entity to Kim Camp III) – David Small
  50 West San Fernando Street, Suite 320
  San Jose, CA 95113
  Phone: 408-938-5793
  Email: dks@ksp-inc.com
- New Property Owner & PRP (Devcon Construction Inc.) – Bret Sisney
  690 Gibraltar Drive
  Milpitas, CA 95035
  Phone: 408-519-8329

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

2. **Site-Specific Health and Safety Plan** — ☐ Readily available — ☐ Up to date — ☒ N/A
   - G Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

7. **Groundwater Monitoring Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks_____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☒ Other __O&M has not occurred since discontinued monitoring in 2006__

2. **O&M Cost Records**

☐ Readily available ☐ Up to date ☒ N/A

☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☒ N/A (mostly)

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks MW-7 and MW-8 are located on Qualcomm property, secured by a fence, entrance barriers, and a guard _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) None since 2006, which had been conducted by PRP contractor

Frequency _____

Responsible party/agency Kimosabe Corp.

Contact David Small (Name) Former Property Owner (Title) Jan-2012 (Date) 408.938.5793 (Phone no.)

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☒ No ☐ N/A

Other problems or suggestions: ☐ Report attached

Monitoring at the site should continue in order to assess natural attenuation and support an adequate Five Year Review of the site remedy. USACE plans to conduct one monitoring event prior to completing the Five Year Review, where monitoring results will be compared with previous data. PRPs have no plans to sample.

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☒ N/A

Remarks_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks_____

2. **Land use changes on site** ☒ N/A

Remarks_____

3. **Land use changes off site** ☒ N/A

Remarks_____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☒ N/A

Remarks_____

B. Other Site Conditions

Remarks ___Site is located in a light Industrial Park with many parking lots_____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent_____
   ☐ Ponding ☐ Location shown on site map Areal extent_____
   ☐ Seeps ☐ Location shown on site map Areal extent_____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent_____
   Remarks_____
   _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
   Areal extent_____
   Remarks_____
   _____

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
   Remarks_____
   _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
   Remarks_____
   _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
   Remarks_____
   _____

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active G Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition G Needs Maintenance
   Remarks_____
   _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____
   _____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____
   _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____
   _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____
   _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____
   _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____
   _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____
   _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____
   _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable; However, Pump and Treat remedy has not been operational since 1995 and All above ground components of the groundwater treatment plant were removed shortly after discontinued pumping.

☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☐ Good condition ☐ All required wells properly operating G Needs Maintenance G N/A
   Remarks_____
   _____
   _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
   - ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   - ☐ Air stripping ☐ Carbon adsorbers
   - ☐ Filters_____
   - ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   - ☐ Others_____
   - ☐ Good condition ☐ Needs Maintenance
   - ☐ Sampling ports properly marked and functional
   - ☐ Sampling/maintenance log displayed and up to date
   - ☐ Equipment properly identified
   - ☐ Quantity of groundwater treated annually_____
   - ☐ Quantity of surface water treated annually_____

   Remarks_____
   _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☐ Good condition G Needs Maintenance

   Remarks_____
   _____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance

   Remarks_____
   _____

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks_____
   _____

5. **Treatment Building(s)**
   - ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   - ☐ Chemicals and equipment properly stored

   Remarks_____
   _____

6. **Monitoring Wells** (pump and treatment remedy)
   - ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   - ☐ All required wells located ☐ Needs Maintenance ☐ N/A

   Remarks_____
   _____

D. Monitoring Data ☒ Monitoring has not occurred since 2006

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Pump and Treat remedy has not been operational since 1995. MNA remedy has not been formally adopted in a ROD amendment.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

N/A

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. See part A
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. N/A

Photos from Site Inspection Visit

Micro Storage Corporation (MSC) Property.

Parking lot on MSC property, facing north.

Parking lot on MSC property, facing west.

MSC property, former treatment plant area.

Intel Magnetics (IM) property.


Metropolitan Corporate Center (MCC) property, northeast corner.

Monitoring well in MCC parking lot.

Monitoring well in MSC parking lot.

Monitoring well IM-10 adjacent to MSC building.

Monitoring well IM-2 north of MSC building.

Monitoring well close-up, showing standing water in flush-mount vault.

Man hole cover above monitoring well MW-4.

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Appendix E: Title Search Documentation

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REVIEW OF TITLE EXCEPTIONS
INTEL MAGNETICS SUPERFUND SITE

This is a title review of two (2) tax parcels of land in Santa Clara, California (Santa Clara County) in support of the Intel Magnetics Superfund Site project. The tax parcels involved in this review include two (2) parcels currently owned/operated as follows:

- APN 216-48-25 (owned by 3000 Oakmead Village Drive, LTD)
- APN 216-48-26 (owned by Devcon Investments LLC)

Review performed May 30, 2012

Title Exception Number	**Current Owner and Affected Assessor Parcel Number (APN)**	**Recording Information**	**Instrument Type and Rights Granted**	**Impact to Land Restrictions/Institutional Controls Contained in "Covenant and Agreement to Restrict Use of Property" Book N132, Pg 0096, Document No. 12209391, recorded November 12, 1993**
1 - 3	3000 Oakmead Village Drive, LTD APN 216-48-25	Not Applicable	Not Applicable	None
4	3000 Oakmead Village Drive, LTD APN 216-48-25	Book B374, Pg 410, recorded April 23, 1975	Easement for Public Utility and incidental purposes granted to the City of Santa Clara. Easement should be mapped to determine location.	None – Utility excavations are excluded from Land Restrictions
5	3000 Oakmead Village Drive, LTD APN 216-48-25	Book C720, Pg 108, recorded April 6, 1977	Declaration of Covenants, Conditions and Restrictions for development of Oakmead Business Park.	None
5.1	3000 Oakmead Village Drive, LTD APN 216-48-25	Book D459, Pg 418, recorded February 10, 1978	First Amended Declaration of Covenants, Conditions and Restrictions for development of Oakmead Business Park.	None
6	3000 Oakmead Village Drive, LTD APN 216-48-25	Book C795, Pg 549, recorded May 4, 1977	5' sidewalk easement for sidewalk and incidental purposes granted to the City of Santa Clara.	None – "Improvements" are excluded from Land Restrictions

Title Exception Number	Current Owner and Affected Assessor Parcel Number (APN)	Recording Information	Instrument Type and Rights Granted	Impact to Land Restrictions/Institutional Controls Contained in "Covenant and Agreement to Restrict Use of Property" Book N132, Pg 0096, Document No. 12209391, recorded November 12, 1993
7	3000 Oakmead Village Drive, LTD APN 216-48-25	Book C795, Pg 550, recorded April 1977	5" sidewalk Agreement (Covenant running with the land and lien) between the City of Santa Clara and New England Mutual Life Insurance.	None – See #6
8	3000 Oakmead Village Drive, LTD APN 216-48-25	Book D489, Pg351, February 27, 1978	Easement for underground electrical and incidental purposes granted to the City of Santa Clara.	None – See #4
9	3000 Oakmead Village Drive, LTD APN 216-48-25	NA	Easement for proposed 25' ingress-egress and storm drain and incidental purposes.	None – See #4 and #6
10	3000 Oakmead Village Drive, LTD APN 216-48-25	Book D875, Pg 297, recorded August 9, 1978	Terms and provisions contained in the document entitled "Agreement" between the City of Santa Clara and New England Mutual Life Insurance Co to locate common driveway and common storm drainage area.	None – See #4 and #6
11	3000 Oakmead Village Drive, LTD APN 216-48-25	Book J355, Pg 1666, document No. 8419929, recorded May 24, 1985	Deed of trust to secure original indebtedness with Gate King Properties.	None
12	3000 Oakmead Village Drive, LTD APN 216-48-25	Document No. 20775359, recorded July 15, 2010	Notice of non-responsibility executed by 3000 Oakmead Village Drive, LTD for unauthorized repairs alterations, redecoration and/or leasehold improvements.	None
13	3000 Oakmead Village Drive, LTD APN 216-48-25	Document No. 20775359, recorded July 15, 2010	Notice of non-responsibility for tatutory liens for labor or materials arising by reason of a work of unauthorized improvement	None

Title Exception Number	Current Owner and Affected Assessor Parcel Number (APN)	Recording Information	Instrument Type and Rights Granted	Impact to Land Restrictions/Institutional Controls Contained in "Covenant and Agreement to Restrict Use of Property" Book N132, Pg 0096, Document No. 12209391, recorded November 12, 1993
14	3000 Oakmead Village Drive, LTD APN 216-48-25	Document No. 21097317, Resolution No. 10-32, recorded March 1, 2011	Effect of Resolution 10-32 to dissolve Community Facilities District No. 1 of the Santa Clara Unified School District. No financial impact to the district.	None.
15	3000 Oakmead Village Drive, LTD APN 216-48-25	Document No. 21101793, Resolution No. 10-40, recorded March 4, 2011	Resolution of the Board of Education to dissolve Community Facilities District No. 1 of the Santa Clara Unified School District. No financial impact to the district.	None
16 - 18	3000 Oakmead Village Drive, LTD APN 216-48-25	NA	Not Applicable	None
19 - 22	Devcon Investments LLC APN 216-48-26	Not Applicable	Not Applicable	None
23	Devcon Investments LLC APN 216-48-26	See #4		
24	Devcon Investments LLC APN 216-48-26	See #5		
24.1	Devcon Investments LLC APN 216-48-26	See #5.1		
25	Devcon Investments LLC APN 216-48-26	Book D483, Pg 264, recorded February 23, 1978	Terms and provisions contained in the document entitled "Agreement" between the City of Santa Clara and New England Mutual Life Insurance Co to locate common driveway and common storm drainage area.	None – See #4 and #6

Title Exception Number	Current Owner and Affected Assessor Parcel Number (APN)	Recording Information	Instrument Type and Rights Granted	Impact to Land Restrictions/Institutional Controls Contained in "Covenant and Agreement to Restrict Use of Property" Book N132, Pg 0096, Document No. 12209391, recorded November 12, 1993
26	Devcon Investments LLC APN 216-48-26	Book D493, Pg 506, recorded February 28, 1978	Deed Reservation of an easement for ingress and egress for common driveway and incidental purposes granted to New England Mutual Life Insurance Company.	None – See #4 and #6
27	Devcon Investments LLC APN 216-48-26	NA	Easement for proposed 25' ingress-egress and storm drain and incidental purposes.	None – See #4 and #6
28	Devcon Investments LLC APN 216-48-26	Book D503, Pg 334, recorded March 3, 1978	Deed Reservation of an easement for ingress and egress for common driveway and incidental purposes granted to New England Mutual Life Insurance Company.	None – See #4 and #6
29	Devcon Investments LLC APN 216-48-26	Book D506, Pg 653, Document No. 5945252, recorded March 6, 1978	Terms and provisions contained in the document entitled "Agreement" between the City of Santa Clara and New England Mutual Life Insurance Co to locate common driveway and common storm drainage area.	None – See #4 and #6
30	Devcon Investments LLC APN 216-48-26	Book N132, Pg 0096, Document No. 12209391, recorded November 12, 1993	Covenant and Agreement to Restrict Use of Property. Covenanter promises to restrict the use of the Property as follows: *"No Production Wells, or borings or wells penetrating through the "A" water bearing zone, may be drilled on the Property without the express prior written approval of the Regional Board and any other agency with jurisdiction."*	None - This is the subject Land Restrictions for the site.

Title Exception Number	Current Owner and Affected Assessor Parcel Number (APN)	Recording Information	Instrument Type and Rights Granted	Impact to Land Restrictions/Institutional Controls Contained in "Covenant and Agreement to Restrict Use of Property" Book N132, Pg 0096, Document No. 12209391, recorded November 12, 1993
31	Devcon Investments LLC APN 216-48-26	See #14		
32-33	Devcon Investments LLC APN 216-48-26	NA	General statements on easements, rights of parties, issuance of title insurance	None

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Appendix F: Interview Forms

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INTEL MAGNETICS/MICRO STORAGE CORPORATION
FOURTH FIVE-YEAR REVIEW
INTERVIEW QUESTIONS

Table 1. Interview Questions for State Interviewee(s) (David Barr, RWQCB) January 23, 2012

Q1: What is your overall impression of the IM/MSC Superfund Site (general sentiment)? **A1: The IM/MSC Site was one of the earlier Superfund sites established in the Bay area that dealt with groundwater contamination. When the site was initially established, the groundwater contamination was considered notable and taken seriously. However, the level of contamination present on site now, considering the reduction due to operation of the pump and treat remedy for many years, and considering the fact that there are numerous other much more contaminated sites, isn't considered as serious as it once was.**
Q2: What is your current role and your agency's role with respect to the site? **A2: The State Regional Water Quality Control Board (RWQCB) was the IM/MSC Site regulatory lead agency from 1989-2006; however, the lead role was transferred to the USEPA (EPA) in July 2006. Currently the RWQCB has limited involvement with the IM/MSC Site; primarily limited to occasional communication/information sharing with EPA as required. David Barr is the RWQCB case manager for the Metropolitan Corporate Center (MCC) site, which is immediately west and partly hydraulically upgradient/partly cross-gradient from the Micro Storage Corporation (MSC) portion of the site. Note the MCC site is currently occupied by Qualcomm. EPA and RWQCB communicate with respect to these sites because of co-mingled contaminant plumes at the property boundary between these two properties as evidenced by conditions at well MMW-7. The main source of contamination at the MCC site was a former UST in the area near MMW-10, in the northern part of the MCC property. Principal source was addressed and MCC is left with minor associated groundwater contamination. Furthermore, low level of groundwater contamination near wells MMW-8, -7, and -6 for the MCC Site has been observed but no definitive source in that area was identified. MMW-3, located on the southeast corner of MCC property (and upgradient of MW-1) was destroyed with RWQCB approval because it had been non-detect for contamination each time sampled (MMW-3 was sampled yearly from March 1985 until July 1990; it was last sampled December 1998 and was still non-detect at that time). In addition to the property currently occupied by Qualcomm, MCC at one time owned the property immediately south of the IM/MSC Site. That property transferred hands and the RWQCB will try to identify the new owner. That property is significant because it is upgradient from MW-1, the most upgradient well on IM/MSC Site that has experienced marked rise in groundwater contamination in the most recent rounds of monitoring data.**
Q3: Have there been routine communications or activities (for example, site visits, inspections, etc) conducted by your office regarding the site? If so, please give purpose and results. **A3: There have been no site activities completed for the IM/MSC Site since it was transferred to EPA, except for a site visit with EPA after the transfer (sometime after July 2006).**

Q4: Are you aware if the site has been in compliance with permitting or reporting requirements?
A4: As stated previously, the RWQCB is no longer the lead agency, but David Barr's understanding is that the former owner of MSC (Mr. David Small) owned the property but was not the original PRP. To the best of Mr. Barr's knowledge, Mr. Small complied with all site requirements. Mr. Small's sentiment is that he is weary of the lengthy, drawn-out cleanup process; that he has spent money performing groundwater monitoring over the years, it is still not closed out, and now the issue with the likely upgradient source is an added frustration which further delays closure.

Q5: Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
A5: No.

Q6: Do you feel well informed about the site's activities and progress?
A6: General answer – yes. David Barr has periodically talked with EPA about the site history and status. Although since the RWQCB is no longer lead regulatory agency, Mr. Barr may not be fully informed.

Q7: Are you aware of any changes in State/County/Local laws and regulations that may impact the protectiveness of the site?
A7: No. Land use continues to be the same (commercial/industrial in the area), and downgradient extent of plume remains unchanged to best of his knowledge.

Q8: Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?
A8: The need still remains to determine the source of upgradient contamination for the IM/MSC Site. David Barr thinks it may originate near or upgradient of MW-1. The former remedial consultant for MCC maintains that contamination cannot be coming from the MCC property now occupied by Qualcomm because the UST site was cleaned up and they no longer use TCE since it is just office space. There is no obvious source to the south but some of that land is industrial (rail lines, with rail cars delivering vegetable oil, etc.) so could be something upgradient. Regarding the IM/MSC Site, Mr. Barr thinks it would be acceptable to select a key set of strategic wells to evaluate current groundwater conditions, and to include key wells MW-1, MMW-7. Downgradient wells are not so important since the last data showed contaminant concentrations in that area were stable or decreasing.

Estimates Qualcomm may have been in their current location for as long as 10 years. The initial investigation on MCC property was done in the late 1980s or early 1990s. Mr. Barr believes that the previous tenant, before Qualcomm, stored paper and books on that property.

Regarding any agreements made by regulatory agencies with the former property owner (Mr. Small) to track down upgradient sources, Mr. Barr does not recall that any agreements were made. Mr. Barr

was dealing with the former owner's remedial contractor (Lowney), and they wanted to sample some upgradient wells; however, MCC refused to collect samples. MSC didn't want to do additional upgradient sampling, but said they would sample upgradient wells in lieu of wells on their site. However, none of this discussion was ever finalized or put in writing; it was all just verbal suggestion.

To the best of Mr. Barr's recollection, the RWQCB never said to stop monitoring at the IM/MSC Site. Daewon (EPA RPM) indicated he has an email from Ron Helm, the geologist with the Lowney, the remedial contractor (Note, Mr. Helm has since left Lowney and is working for Cornerstone), directing him to suspend monitoring via communication with Peggy McDaniel (then EPA RPM). This could be correct, but Mr. Barr does not recall such an agreement.

Table 2. Interview Questions for the former and current Property Owners/PRPs, former PRP Remedial Contractor Interviewee(s)
January 17, 2012

Q1: What is your overall impression of the IM/MSC Superfund Site (general sentiment)? *[For new owner only: Are you knowledgeable on the history and current status of the IM/MSC Superfund site? If so, then what is your overall impression/general sentiment? Were there any conditions placed on the sale of the property concerning the IM/MSC site, or were all clean-up responsibilities retained by the former owner/PRP?]* **A1: David Small – General sentiment was that his responsibilities for sampling had been met following site closure with respect to the State and that EPA would investigate possible up gradient contamination and determine path forward for the site.** **Bret Sisney – Knowledgeable of superfund status. Received much of his information concerning the site from David Small.** **Neither David Small nor Bret Sisney were aware of written conditions placed on the sale of the property concerning clean-up responsibility.**
Q2: Is the remedy (currently MNA but not yet documented in a ROD amendment or ESD) functioning as expected? How well is the remedy performing? Are there plans for future compliance groundwater monitoring at the site? **A2: Unknown. Current site remedy as described in the ROD includes pump & treat, which has not operated since 1995. Sampling has not been conducted since 2006, so it is currently not possible to confirm whether or not MNA is occurring. In order to change the ROD remedy to MNA, sampling must be completed that demonstrates natural attenuation is possible given geochemical and microbial environment. USACE plans to conduct one monitoring event prior to completing the Five Year Review, where monitoring results will be compared with previous data. PRPs have no plans to sample.**
Q3: What does the latest-available groundwater monitoring data show? Are there trends that have been documented showing contaminant levels decreasing or increasing? **A3: David Small – Data from 2006 and earlier suggest contaminant concentrations were declining except for MW-1, an up gradient well that has likely been impacted by contamination from an adjacent property.** **Bret Sisney – Much of this information is new to Bret Sisney. He generally concurs with David Small**
Q4: Are you aware of any efforts to demonstrate a hydraulically upgradient groundwater contaminant source? Are you aware of any groundwater monitoring being conducted at any upgradient or adjacent properties? If so, please elaborate. **A4: David Small – Under the impression that Water Board and USEPA were conducting an investigation of the potential up gradient source.** **Bret Sisney – Much of this information is new to Bret Sisney. He generally concurs with David Small** **The Third Five Year Review state in section 5.3.2, "The Water Board, in conjunction with the USEPA is further investigating to identify potential off-site sources of VOCs and MTBE migration onto the IM/MSC Site." Furthermore, Table 8-1 recommends that the PRP "Continue current investigation of the potential off-site, upgradient source."**
Q5: Has the combined (IM, plus MSC) groundwater extraction and treatment system been operated at all since it was approved for shut down by the CA RWQCB on 4/1/1995?

A5: No (all interviewees)

Q6: Has there been any Superfund site-related activities on site in the last five years? If so, please give details.
A6: No (all interviewees)

Q7: Have any site institutional controls to prevent exposure to or ingestion of groundwater been identified or implemented within the last five years? Have any restrictive covenants or other changes been made to the property title or deed for either the IM or MSC properties in the last five years (a covenant was recorded for the MSC property prior to passage of CA Civil Code S1471, establishing the framework for environmental covenants in CA)?
A7: No institutional controls have been identified or implemented and PRPs are unaware of any restrictive covenants or other charges made to the property title or deed for either property. (All interviewees)

Q8: What is the current and projected future ownership status and plans for the site (we understand the property was recently sold)? What is the current zoning status of the property, and has that changed in the last five years?
A8: Bret Sisney - Devcon Construction is the current owner of MSC and has no future plans to sell the property.
Communications with IM property owner have not yet occurred and Bret Sisney is unaware of any IM plans. Zoning likely remains light industrial.

Q9: Are you aware of any trespassing or vandalism with respect to any monitoring wells or groundwater treatment system components within the last five years? Are all wells secured with locking caps? Are the buildings that housed IM and MSC currently occupied? What security measures are in place to prevent vandalism and/or trespass?
A9: David Small - All above ground components of the groundwater treatment plant were removed shortly after discontinued pumping in the mid-1990s.
PRPs are unaware of any trespassing or vandalism and there was no evidence upon inspection of many of the wells. Locking caps are present in wells, but can be removed without a key. MW-7 has been covered with cement and it is not yet known whether access to this well could be re-gained. MMW-7 was not located during the site visit. Buildings that housed IM and MSC are currently occupied. Micro Chem has leased the building that had been occupied by MSC since 1993 and will continue to occupy the building under the new owner. Most of the site is open access and there are no security measures for many of the monitoring wells. However, MW-7 and MW-8 are located on Qualcomm property, secured by a fence, entrance barriers, and a guard.

Q10: Do you have any comments, suggestions, or recommendations regarding any aspects of the IM/MSC Superfund site?
A10: N/A